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A Survey of Research in Psychology

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A Survey of Research in Psychology

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Foreword

THE IDEA of carrying out a survey of research done so far in the field of social sciences was first put forward by the late Dr. D. R. Gadgil, the first Chairman of the Council. In the very first meeting of the ICSSR, he emphasized the need to formulate priorities and significant programmes in promoting social science research in the country and argued that this task would be greatly facilitated if a survey of all social science research conducted so far is quickly carried out. These proposals were accepted by the Council and the ICSSR Research Survey Scheme, 1970, was formulated.

Under this scheme, the entire area of social sciences was divided into seven major fields, viz., (1) economics, commerce and demography, (2) political science, including international relations, (3) public administration, (4) management, (5) sociology, anthropology, social work and criminology, (6) psychology and (7) economic, human, and political geography. For each of these major fields, an Advisory Committee was appointed to plan and implement the programme. Each major field was also divided into a number of subfields, the total number of subfields numbering more than 125. The work of preparing the survey report in each subfield was entrusted to a social scientist selected by the Council on the recommendation of the Advisory Committee. By and large, the focus of the survey was on research carried out by Indians and on Indian problems and each trend report was to be accompanied by a selective bibliography. Subject to this general consideration, each Advisory Committee was allowed to decide the content and format of the survey in keeping with the needs of the discipline concerned.

The work on the programme started early in 1970. The first survey reports were received in June 1970, while some of the last are yet to come. When about 8 or 10 reports in a major field were ready, a seminar was convened to discuss them and the authors of the research reports were requested to revise and finalise them in the light of the discussions. It is these revised reports that were finally edited and sent to the press.

It has been decided that all these research survey reports should be published in a series of fairly uniform volumes. The present

volume of research survey reports in psychology is the first to be published in the series.

On behalf of the ICSSR and myself, I take this opportunity to thank Dr. S. K. Mitra and his colleagues on the Advisory Committee and on the Editorial Board for the labour of love they voluntarily undertook in preparing these research survey reports and in revising and editing them. But for their willing and enthusiastic cooperation, this enterprise would not have been either feasible or successful. I have also no doubt that the entire academic community of teachers and students in social sciences will remain ever grateful to them for this great service they have rendered to the cause of social science research in India.

The ICSSR is considering proposals to keep up this project on a continuing basis by undertaking similar periodical surveys. It is hoped that these proposals will soon be approved and implemented. In these subsequent programmes also, I am sure that the ICSSR will continue to receive the same willing and enthusiastic cooperation of the academic community.

M. S. Gore
Chairman
Indian Council of Social Science Research

New Delhi
2nd October 1971

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Psychological Research in India

By

S. K. Mitra

Introduction

THE STUDY of psychology as a science started in India with the establishment of a Department of Psychology in the Faculty of Science of the Calcutta University in 1915. Research in psychology began soon thereafter. Reviews of psychological research in India have been done earlier by Mitra (1955), Krishnan (1961), Sinha (1963) and Kapoor (1965). These are valuable documents inasmuch as they have kept on record the work done in the field. But they are bare statements of facts and, being very brief, have telescoped the different areas of psychological research into one chapter. The present review, sponsored by the Indian Council of Social Science Research, is a significant departure from these attempts of the past. It devotes one chapter to each of the ten areas of psychology, as given in the *Psychological Abstracts* and thus gives a comprehensive coverage of the entire field of psychological research. This is also a bench-mark survey of Indian work in psychology upto the end of 1969 and should be of great help, not only to the Indian Council of Social Science Research, but to the entire body of psychologists in general in India in recognising trends, giving future directions of growth and, what is of greater significance, in raising the quality of research to greater heights of excellence.

On the recommendation of an Advisory Committee in Psychology, which was set up by the ICSSR to conduct the review of research in psychology, the ICSSR commissioned ten psychologists and requested them to make a review of the research done in the area allocated to each individually. The terms of reference of each re-

viewer were: (1) to present an overview of research done in his area; (2) to point out gaps; and (3) to indicate future directions of work. The first drafts of the reviews were prepared between September 1969 and March 1970. These drafts were discussed in a national seminar of over forty psychologists in August 1970. They were then revised on the basis of comments and suggestions offered in the seminar. The revision and editing of these reviews was completed between September 1970 and March 1971.

The work of the survey has required abstracting from more than 3,000 references. Perhaps there are more references; but it is hoped that at least all important researches have been covered in this survey. It may be further pointed out that it is not absolutely essential to locate each and every reference. What is more important is to ascertain the broad trends of research in a given area. One should not also expect to find any sensational finding or discovery in this review. Many Indian psychologists have done very able work; and its evidence will be found in some of the references cited in the reviews.

The reviews show that the volume of work done in psychology is large and that there has been a vigorous growth of psychological research in India, especially in the last ten years. It is to be noted, however, that the bulk of this research arose out of the process of the birth and development of scientific psychology in India. Creative work is rare anywhere. It is also rare in psychology in India, where we have largely been at the consumer end in respect of new knowledge and its applications.

Development of Psychology in India

Though the origin of psychology in India goes back to ancient times, the foundation of scientific psychology was laid only in the twentieth century, as noted earlier, with the establishment of a psychological laboratory in Calcutta University in 1915. This was followed by Mysore where a Department of Psychology in the University of Mysore started functioning in 1924. The Indian Psychoanalytical Society was founded by G. Bose in 1922 and the Indian Psychological Association was formed in 1924, both having their headquarters in Calcutta. The *Indian Journal of Psychology,* which is the official organ of the Indian Psychological Association, made its appearance in 1925. Soon after this, Sengupta started a psychological laboratory in Lucknow, though an independent department of psychology did not exist. In 1946, Patna University started two full-fledged departments of Experimental and Applied Psychology, although the work in Applied Psychology had started earlier at

Calcutta. Thus the period before independence saw the beginnings of scientific psychology in India, with a few university departments offering post-graduate courses in psychology, a scientific journal for the publication of research papers and a professional association to develop the image of the new science. In the post-independence period, ten new university departments were added during the decade beginning in 1950. In the next decade, seventeen more were added (*U.G.C. Report,* 1968). At present, there are 33 university departments of psychology.

The development of new departments in the universities has taken at least five years in each case. This includes the provision of teaching staff, laboratory equipments, development of curriculum, journals and other facilities for research. This was a phase of expansion and consolidation. It is remarkable that, in spite of the difficulties that go with establishing of new departments, there have been a large number of publications. As the references in the various chapters show, 90 per cent of publications in each field date from 1950, except in the areas of Experimental and Social Psychology, where the figures are around 70 and 77 per cent respectively, because these are the two areas where research was done from 1915 onwards. The three areas—Clinical, Personality and Social Psychology—account for 50 per cent of the published material since 1950. The average annual production in these fields is 25 per year, whereas it is practically half of that in the seven other fields reported in this review. It may be noticed further that 62 per cent of all publications listed are from the post-1960 period. There is thus an accelerated tempo of research over the years. On the average, there has been a production of 150 papers per year since 1950.

The rapid increase in research activity in psychology since 1950 can be seen both in the number of references in the ten reports and in the increase in the number of journals. The number of professional journals is another indication of the amount of research in a field. Whereas there was only one professional journal in psychology before 1950, there are more than a dozen at present.

Some of the psychological journals which are published regularly are: *Indian Journal of Applied Psychology, Indian Journal of Experimental Psychology, Indian Journal of Psychology, Indian Psychological Review, Journal of the Indian Academy of Applied Psychology, Journal of Psychological Researches, Manas,* and *Psychological Studies.* Many good articles of psychological research done by Indians are published in foreign journals, and in journals of education, social work and university journals. Recently articles in psychology have appeared in regional languages as well.

In addition to the university departments of psychology, psychological research is a regular feature of many research institutes and organizations. These include: Directorate of Psychological Research in the Defence Science Organization of the Ministry of Defence; Indian Institute of Technology; Indian Institute of Science; Indian Institute of Management; Indian Agricultural Research Institute; Indian Institute of Mass Communication; National Council of Educational Research and Training; National Institute of Community Development; National Institute of Family Planning; National Institute of Health Administration and Education; Sri Ram Centre for Industrial Relations; Centre for the Study of Developing Societies; A. N. Sinha Institute of Social Studies; Tata Institute of Social Sciences; and All-India Institute of Public Health and Hygiene. This list indicates the diverse areas to which psychology has spread. The challenge of working in new areas has attracted a number of very able Indian psychologists trained abroad. These organizations have not only stimulated the quantity of research, they have opened up new areas of research in psychology in India. A fairly large number of well-trained psychologists are working outside the straight academic departments in the universities. This is likely to influence psychological research in India. But as it is a fairly recent development, it is too early to make any assessment. The recent publication of the ICSSR on doctorates in social sciences in India shows that, upto 1969, approximately 250 persons received their doctorate in psychology in the various Indian universities, whereas more than 300 were on rolls in 1969 (*ICSSR*, 1971). This shows that there has been a rapid increase in doctoral studies in psychology.

There are several professional organizations of psychologists in India. At the national level, there is the Indian Psychological Association with branches in some states. It publishes its official organ, *Indian Journal of Psychology*, which is the oldest psychological journal in India and is now in its 46th volume. There is also an Indian Academy of Applied Psychology and an Indian Association of Clinical Psychologists. There are other associations like Bihar Psychological Association, Gujarat Psychological Association, Madras Psychology Society and Mysore Psychological Society. In addition, there is a Psychology and Educational Sciences Section of the Indian Science Congress Association, which meets annually for a week in January, when scientific papers are read and symposia are held.

Growth of Psychological Research

We shall consider here the broad picture of growth of research in psychology over the years and the differences between the areas

of psychology. For this analysis, we depend on the references (about 3,300) given in the ten reviews.

TABLE NO. I

The Percentage of Research Papers Over the Years

Year	*Percentage*	*Cumulative Percentage*
1966 and after	36	100
1961-1965	26	64
1956-1960	19	38
1951-1955	10	19
1946-1950	4	9
1941-1945	2	5
1936-1940	1	3
1935 and before	2	2

TABLE NO. II

Post-1950 Publications in the Different Areas and Years

	1951-55	*1956-60*	*1961-65*	*1966 & after*	*Total*
Methodology	10	35	80	42	167
Experimental	21	64	91	112	288
Physiological and Comparative	3	12	18	49	82
Developmental	4	16	32	60	112
Social	41	94	100	167	402
Personality	20	71	173	261	525
Clinical	54	136	152	235	577
Educational	9	30	68	86	193
Industrial	51	84	96	122	353
Military	112	70	55	45	282
Total	325	612	865	1179	2981

TABLE NO. III

Percentage of Papers in Different Areas

Area	*Percentage*
Methodology	6
Experimental	12
Physiological and Comparative	2
Developmental	4
Social	16
Personality	17
Clinical	19
Educational	6
Industrial	11
Military	6

Table I shows clearly that there has been a rapid growth in the volume of research in recent years. The period of rapid growth came after 1960. The last decade shows 62 per cent of all publications. The explanation of this lies in the fact that 10 university departments were established between 1950 and 1960 and 17 more since 1960. Hence there was a rise in the output from 1951. It increased by 2.5 times from 1961, with 33 university departments and about 10 others in other institutions of higher learning. There should be 215 highly trained persons in the field (using 5 as the average number of persons per department). This is a conservative estimate. There are psychologists working elsewhere, as in hospitals. But these positions are not primarily for research.

Assuming that there are 250 persons well trained and in a position to do research, we should expect at least 250 papers per year. Table III, however, shows that, for the past 20 years, the average is 150 per year. In each of the areas of Clinical, Social and Personality—the three areas which account for half of the total production—the average is roughly 25 papers per year, as against 12 papers approximately for each of the other seven areas. It seems that not all who are holding teaching positions do research and that research interest is mainly in Clinical and Social Psychology and in Personality. With at least 10 psychological journals and 250 well-trained persons, an average production of 150 research papers per year cannot be regarded as satisfactory. Research should be stimulated to grow in the areas other than Social, Clinical and Personality to remove the imbalance. In these three areas, the time has now come to impose stricter standards and emphasize two types of research: theory construction and social policy.

Table II shows that the early starters were Social and Experimental Psychology. Roughly 30 per cent of the work in each area was done before 1950. But the rate of production has been much higher in Social Psychology because it is easier to produce papers. No big social problem has been tackled and experimental social psychology remains neglected. Industrial Psychology was as productive as Social, as Table III shows; but its rate is now relatively slower than that of Social Psychology. It is curious that except in Military Psychology, every area shows an increasing rate of research, fast or slow. In Military Psychology, however, the picture is reversed and its output has been going down over the years. Educational Psychology has been developing at a fast rate and it can be expected that it will soon catch up with other areas. It has recorded a ten-fold increase in twenty years which is surpassed only by Developmental Psychology and Personality. Developmental Psychology has increased its output 15 times during 1951-70. But the total

volume remains still very low. There are few well-trained and interested psychologists in this area, and the subject is neglected even in the courses of studies offered at the Master's level in psychology. This is, however, a very important area, theoretically as well as practically, and research policy has to take note of this. The work in Physiological and Comparative Psychology seems to have just come of age. Considering the difficulties of experimentation in this area, it is indeed pleasing to note the rapid increase in output in the last 10 years.

Table III shows that 64 per cent of all publications referred to in the reviews are contributed by only four areas: Personality, Clinical, Social and Experimental. Six other areas contribute only 36 per cent. Among these, the most neglected area of research is Physiological and Comparative Psychology. Contrary to popular impression, not much research has been done in the area of Methodology, or there is not much published research. There are a number of unpublished Master's and Doctor's level dissertations and theses in psychology and education, but these have not been considered

Overview

What follows is a brief summary and overview of research done in each area of psychology as it appears from the different chapters of this volume.

I. Clinical Psychology

Krishnan's review covers research in psychopathology (neurological disorders, behaviour disorders, neurosis, psychosis and mental retardation), psychodiagnosis, counselling, guidance and psychotherapy. Attempts have been made to study the various psychopathologies, particularly their diagnostic problems and evaluation of therapeutic interventions. Work has been done in diagnostic tests, various kinds of psychotherapy and counselling. Research in these matters has largely concentrated on adaptation of techniques and instruments. The Seminar recommended that the topics in this area which should receive attention could be: the role of socio-economic, ecological, genetic and cultural factors on the incidence of mental disorders; education and training of the handicapped; suicide and homicide; attitudes to mental illness and hospitals; effect of induced abortion; behaviour modification techniques; diagnostic tools; stress reaction; psychosomatic disorders; and taxonomic approach to behaviour disorder.

II. Developmental Psychology

Parameswaran's review points out that studies with developmental orientation have started only recently. Research in this area is concerned mainly with development of intelligence, abilities, interests, attitudes, emotionality, personality and adjustment. There are only two studies on physical development, three on parent-child relationships and three on learning. But considering its late entry in the field, it seems that developmental psychology is growing rapidly. The Seminar recommended emphasis on longitudinal studies in all aspects of development and high priority to the study of socialisation and child-rearing practices.

III. Educational Psychology

Buch has reported studies on the following topics: attitude and adjustment, testing, physical education, special education, educational and career guidance, personnel, school learning and achievement and teaching methods. Attitudes of students towards school subjects, school activities, religion, vocation, social groups etc. have been studied. There have been a few studies of the effect of instruction on such attitudes. Attitudes of teachers towards their profession have also been studied. Adjustment of students has been studied in relation to intelligence, achievement, age, sex, socio-economic status, anxiety, needs, etc. In testing, Buch has covered only the research in various aspects of examination. There are few studies in physical education and special education. Various aspects of guidance have also been studied. There are several studies of teachers, but very few of headmasters and other personnel in education. There are quite a few studies on achievement, relating it to various factors of ability, school, personality, motivation, etc. There are few significant studies of teaching methods. There are, however, hardly any studies on programmed learning and television. The seminar recommended that greater attention should be given to such topics as adjustment of students in the context of social change; sequential tests of attainment on a national scale; and the dynamics of teaching-learning process.

IV. Experimental Psychology

Kothurkar has divided his review in the following sections: psycho-physics, sensory processes, preception-attention, reaction time, work and fatigue, physiology of behaviour, learning and memory, thinking and problem-solving. It is of interest to note that out of

the 288 studies referred to in the review, only 112 were done after 1950. It seems that the initial impetus for work in this area, which had the earliest start, was lost for sometime, until very recently, when it has begun to recover quickly. There is a good deal of sophistication now in the design of experiments. The topics which need attention, according to the thinking in the Seminar, are: perception; information theory; learning theory; thinking and cognitive processes; and verbal behaviour.

V. Industrial Psychology

D. Sinha's review covers the following areas: Vocational choice and guidance, selection and placement, training, testing and work analysis, performance and job satisfaction, management and engineering psychology, driving and safety. Among these only two areas, viz., performance and job-satisfaction, and management and organization have the largest concentration of studies. The review shows that various aspects of performance, job-satisfaction, management and organization have been studied. Performance and job-satisfaction have also been studied in relation to a number of extrinsic and intrinsic factors. But, as the Seminar pointed out, Indian workers in this area ought to take note of the problems in the following areas: performance and job-satisfaction; management and organization including organizational factors in productivity and supervisory pattern; absenteeism; job attitudes; factors affecting vocational preference and choice; and development of tests for use in industry.

VI. Military Psychology

The work in this area has been reviewed by A. K. P. Sinha. He covers such topics as selection and placement, training, task and work analysis, performance and job-satisfaction, displays, controls, driving and safety. As the work in this area has been done at the Directorate of Psychological Research of the Defence Science Organization, Ministry of Defence, there is an obvious difficulty in reporting all research. Besides, classified information is not published in journals. Sinha's review, however, covers all that has been published and shows generally the kind of work that has been done in this area.

VII. Personality

Shanmugam's review of the research done in this area covers assessment techniques, motivation, self concepts, socio-cultural factors

(including studies on leadership, authoritarianism, etc.), learning, perception, psychopharmacology, delinquency, criminality and abnormal personality. He has noted that the studies have gradually become more sophisticated over the years, a trend which has been noticed also by Kothurkar. Indian concepts of personality have not received much attention. In the Seminar, the following topics were recommended for greater attention: altered states of consciousness and personality theory; deprivation in relation to personality formation; creativity; identity crisis; psychopharmacology and psychotechnology.

VIII. Physiological and Comparative Psychology

M. M. Sinha has reviewed this area and has reported studies in animal psychology on such topics as comparative psychology, natural observation, early experiences, motivation, learning, social and sexual behaviour, and sensory processes. In Physiological Psychology, studies are reported on such topics as brain lesions, brain stimulation, electrical activity, sensory physiology, biochemistry, cardio-vascular process, environmental stress, personality correlates and nutrition. He has noted an increasing interest in psycho-pharmacological research and has underlined the need for private laboratories. The seminar indicated the need for emphasizing the study of neurophysiological correlates of behaviour.

IX. Social Psychology

Rath's review of research in this area shows that work has been done on the following topics: cultural and social processes, ethnological studies, socio-economic structure and social role, religion, cross-cultural comparisons, family, social change, scales of attitude measurement, surveys of attitude formation and change, group and interpersonal processes, influence and communication, social perception and motivation, language, psycho-linguistics, syntax, aesthetics, sexual behaviour, smoking, drug and alcohol use, and methodological contributions. While noting that a large number of studies and empirical research have been done in this area, Rath has pointed out that theory and methodological development should receive greater attention than what it has received so far. About 50 per cent of the studies reported in this review are on cultural and social processes. The Seminar, while considering the needs in this area, recommended the following as requiring immediate attention: social change; generational conflict including youth studies and student unrest; social tensions; social implications of technological

change; psycho-social barriers to economic development; socialisation; interpersonal and intra-group relations; behavioural aspects of political participation; unemployment and poverty. The need for inter-disciplinary research in this area is obvious.

X. Methodology and Research Technology

My review of the work in this area shows that work has been done mainly in test construction, validation and factor analysis, with a little bit of work on methods. The number of studies reported in the review shows that published research in this area is not much. The topics which should receive greater attention are: mathematical and statistical psychology, including the development and application of models of human behaviour; computer programming; and selective development of apparatus and tests.

In forming an overall impression of the research done in psychology in India, one is struck by the fact that there is an immense diversity of interests of researchers in the field, which is reflected in the wide variety of problems on which work has been done. At the same time, one notes for the same reason, perhaps, there are no broad themes of research in which significant problems have been tackled in a systematic way. The recommendations of the Seminar, which have been stated earlier in connection with the summary of work reported in each review, indicate the emergence of such themes. The study of social change is one such theme. On the broad canvas of social change, one has to study socialisation, child-rearing practices, personality development and stress reaction, youth and student unrest, management and organization, social tensions, and interpersonal, intra and inter-group relations. The other recommendations of the Seminar pertain to theoretical and methodological issues in each area of psychology.

Future Development

The development of psychological research depends on many factors. First, it requires well-trained psychologists. Second, research facilities are needed. Third, it requires an awareness of the use of psychology on the part of the Government, the public sector enterprises, and the educational system. Fourth, of course, is financial outlay. We shall briefly discuss each of these factors.

(1) The previous sections present a bird's eye view of psychological research in India. One can see the increase in quantity and quality during the last decade. This has been due, in large measure, to the entry of well-trained psychologists in the field of re-

search. Now that the state of consolidation is coming to an end, there must be many more well-trained psychologists in order that competition may be keener and the social value of the pay-off from good research may grow. Simultaneously it is necessary to improve the quality of the existing flow of personnel from the various departments of psychology in the universities and in other institutions of higher learning. This cannot be achieved unless we attract more talented students, make research methodology a compulsory subject of study for all students at the post-graduate stage and beyond, introduce refresher courses for the teaching staff, and, above all, modernise the syllabi of studies in psychology at all levels. It is not possible to develop expertise in all fields of psychology, and so it is necessary and economical for a department to develop expert knowledge, skill and facilities in only one or two fields of psychology. In the matter of training, the ICSSR can provide an impetus by organizing a few summer schools in selected departments of psychology. Such schools should focus on contemporary research in specific topics in psychology. These measures, however, will be peripheral unless, at the same time, the problems mentioned above are tackled at the UGC level.

(2) In order to encourage younger people it is necessary to provide sufficient research facilities in psychology in the various university departments as well as in other institutes of higher learning. Research facilities are of various kinds of which only a few need to be mentioned here:

(a) A good library of books and journals, particularly of back volumes, is a pre-requisite for research. The UGC should give special grants to selected departments of psychology for the development of a specialised library of books, journals and back volumes (perhaps in microfilms). The ICSSR, in collaboration with such departments, can develop a research abstracting service which would be of great use to workers in the field.

(b) Computational facilities are equally necessary. The departments require small desk calculators, statistical tables and other aids. It is, however, necessary that the departments have easy access to a modern high-speed computer. Research with mathematical and statistical models, large national samples, scaling, factor analysis as well as other complex statistical analysis, simulation studies which have not developed so far, can be considerably stimulated by providing easily accessible computer services. Of course, it will require the training of research workers in computer programming and ICSSR can set up a few training courses for this purpose, once the computer services are available.

(c) Specialised laboratories will have to be developed in order that

experimental work in all branches of psychology can reach contemporary international standards of work. Such laboratories should have a good stock of modern apparatus and collection of tests in one or two areas of specialisation. Either a modern workshop should be attached to the laboratory to improvise equipment, or there should be easy access to such workshops. The impact of modern technology is not restricted to the lives of ordinary citizens; technology influences the growth of science as well. Thus, a skinner box or a group dynamics laboratory with video-type facilities will immediately affect the study of learning process and of the group dynamics. An apparatus like the polygraph is needed in most psychological laboratories. It is therefore necessary to emphasize the importance of updating our psychological laboratories, if complex psychological phenomena are ever to be brought for study in the laboratory. Here, again, the UGC and the ICSSR should coordinate their approaches and set up a committee to inquire into the requirements of specialised laboratories.

(3) Like many other forms of human behaviour, research activity is stimulated by social demand and appreciation. In research, social demand itself is an expression of appreciation. There should be demands for psychological research of different varieties from the Government, semi-government agencies, industry and business, educational institutions and other organizations. In our country there is considerable scope for improvement in this regard. Research sponsored by various public and private agencies has yet to develop. If the agencies do not sponsor research, because they think that Indian psychologists tend to be academic, they may be right in their judgment but not in the matter of finding a solution to the problem of making research more useful. The chances are that by making demand for psychological research apparent, more useful research will be produced in the long run. It will also throw the necessary challenge to Indian psychology which it has lacked so far. It is here that ICSSR can play a leading role by using its influence on various agencies, and particularly the Government, so that there is an increasing demand for psychological work.

(4) A rising demand is reflected in increasing financial outlay. There has been no study of the funding of psychological research in India. But it is known that university departments have practically nothing to spare for research from their annual budgets. Funds for library and laboratory are usually budgeted; but the amount is woefully inadequate for the development of research facilities considered earlier. Only token grants for small amounts are available.

The erstwhile RPC of the Planning Commission had supported

some research in social psychology. The CSIR had occasionally financed psychological research. The ICMR supports research in physiological psychology and mental health. The NCERT supports research in educational psychology. But the beneficiaries of such grants have been few and the total amount of money spent so far will be found to be small in relation to the needs of the situation. The psychologists look forward to larger investment in the near future through the ICSSR.

Not only should larger amounts of money be invested in research, there should also be a policy of research funding so that there is an organized attempt to develop research in psychology to international standards.

We have considered above some of the important factors in the development of psychological research in India. These considerations, however, are for the development of psychological research in general. As we have seen earlier, while considering the total pattern of growth over the years, we have reached the end of the stage of consolidation. The next is the stage of 'take off'. The inputs that we have considered in this section should help in expediting the process of growth and bring about a sure 'take off'. We shall very soon reach the 'critical mass' (if we have not already achieved it) in terms of the number of highly trained persons in the field. The time is therefore ripe for putting the additional inputs into the system, so that psychological research in the country can attain new heights of excellence.

The above considerations, however, do not indicate the direction of research. In the National Seminar of Psychologists where the first drafts of the reviews were discussed, apart from specific problems in each area, broadly two directions of growth in research emerged: (1) First, there is a broad spectrum of problems in social, industrial, educational, developmental, clinical and personality psychology which are concerned, in one way or the other, with the relationship of human behaviour, in individuals and groups, with social processes and forces. This is where psychology touches sociology, anthropology, social work, management and political science. Problems in this area are truly interdisciplinary and should be tackled as such. But it is a direction in which psychology in India has to grow.

(2) The second direction of growth is towards a 'hard-headed' science involving greater methodological rigour by way of quantitative techniques, specialised laboratory and equipment, using neurophysiological and biochemical variables and information theory. This is in the tradition of experimental psychology as a science and involves animal and physiological psychology and research tech-

nology and methodology. Although it looks very abstract, one significant area of research, viz., psychopharmacology, has implications for personality and clinical psychology. It has implications also for all social sciences concerned with the processes, techniques and ethics of the control of human behaviour.

Inter-Disciplinary Research

Problems of human behaviour have to be studied in the wider context of social change, as has been indicated earlier in discussing the future development of psychological research in our country. During the course of its development, a country throws up many social issues and our country is no exception to this rule. It is through the resolution of such social issues that a society attempts to find itself. The history of the social development of a nation is not a story of smooth unfolding; it is a succession of crises and conflict-resolution, very much like the development of personality. In India, independence released many forces, economic, political, social and cultural, which have influenced the course of our development in the last two decades. During this process, new forces have been created and released, adding to the complexity of the situation and affecting the tempo of development. It is against this broad canvas that we have to understand our social problems and through a scientific understanding, help in a healthy resolution of conflicts. This is a challenge which psychology in this country should take up along with the other social sciences.

It is only through the accomplishment of such a challenging task that psychology in this country will develop a distinctive character of its own by producing new theories at the fringe areas where different disciplines overlap. In addition, there will be the satisfaction of participating in the exciting adventure of finding a path for a developing nation. It will, therefore, be in the fitness of things, if the ICSSR sets up interdisciplinary research teams, including psychology, for the study of salient social problems.

One can point out several social problems which demand a concerted attack from different points of view, e.g., the effects of industrialization and urbanization, different facets of modernization, etc. No attempt will be made here to present an exhaustive list of such problems. On the contrary, only a few salient problems will be pointed out where psychology has obviously something to contribute as its share to the solution.

(a) One can make a start with the child. We need to study the effects of malnutrition, cultural disadvantage, child-rearing practices, home environment, the effects of school and sports on the

healthy development of the child, physically, mentally, socially and culturally.

(b) The crisis of the youth also needs our attention. What are the sources of this crisis, what is its nature, what ideas, ideals, values, emotions and attitudes are involved? How are the youth affected by change, what change and how much? How are they affected, what do they want to do and what are they likely to do? What are the political, economic, historic, cultural and other social forces acting on them individually and in informal and organized groups? These are the various aspects of youth unrest today which need a concerted interdisciplinary approach for study.

(c) Then there is the area of work. Work motivation, unemployment, personal selection, industrial conflicts, management and organization are some of the facets of the problems concerned with productivity and economic growth where inter disciplinary research will be useful.

(d) Emergence of new leadership on the political plane and in political organization, voting behaviour, development of institutions and regional development are other aspects of our social change which need close study.

(e) There are the wider social problems of group tensions, minority groups, prejudice, and bilingualism where various social sciences should come together, in order to understand such problems objectively and in all their complexity and depth.

(f) The problems of crime and mental health should not be neglected. There is the vast problem of social rehabilitation as well as of epidemiological aspects of mental health. For developing preventive programmes it is necessary to study carefully, in an interdisciplinary framework, the areas of vulnerability and sensitivity in so far as mental health is concerned.

Conclusion

Psychology in India has developed to a point where it is almost ready to take up new challenges and attain greater heights of excellence in research. It needs some help from bodies like the UGC and ICSSR. It is to be hoped that such help will be forthcoming. By sponsoring this survey of research, the ICSSR has already given Indian psychology a thrust forward. There also appears a new horizon which beckons Indian psychologists to an adventure into fresh discoveries about man and society and we should not lag behind other social scientists in helping the nation to take a jump forward.

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A Survey of Research in Psychology

1

Clinical Psychology

A Trend Report

By

B. Krishnan

Introduction

THE STUDY of clinical psychology is gradually gaining ground in our country. Its progress has been less rapid in India than in some of the countries of the West, perhaps because the social, economic and political conditions which generally influence its development were not equally powerful here. However, in the post-independence period, with its technological development and impact of western ideas, there is a growing awareness of the usefulness of psychological researches in its several fields. This trend will necessarily be strengthened in the years ahead.

Though psychology was introduced as a discipline in the University of Calcutta as early as in 1915 and in the University of Mysore in 1924, the majority of other Indian universities introduced the subject at the university level only in late 1940's. Calcutta University, again, gave a lead by starting an applied section in the Psychology Department in 1938 with a view to developing psychological testing and offering help to the students in the selection of their courses and vocations and building up occupational information through job-analysis. Calcutta University was also first in training younger people in psycho-analysis as a method of psychotherapy. The Indian Psycho-analytical Society which was founded in 1922 by Prof. Girindra Sekhar Bose, started the Lumbini Park Mental Hospital in Calcutta in 1940. Since then, it has been rendering excellent service to the community. The University Grants Commission, in their report[1]

1. "Psychology in Indian Universities": *Report of the Review Committee of the University Grants Commission*, New Delhi, 1968.

list 19 Universities[2] offering a course in clinical psychology as an optional paper at the Master's level. Though all of them do not provide facilities for practicum or internship in hospital setting,[3] almost all the universities provide intruction in 'Abnormal Psychology' or 'Psycho-pathology'. Some universities teach a paper on Psycho-analysis. The three major clinical centres which train clinical psychologists providing supervised practicum or intern training facilities are: (1) All India Institute of Mental Health, Bangalore; (2) Hospital for Mental Diseases, Kanke, Ranchi; and (3) Mental Hospital, Lumbini Park, Calcutta. So far, the All India Institute of Mental Health has trained 114 clinical psychologists from the date of its inception.[4]

The clinical psychologists in the country have organized an All India Association of their own and their first Convention was held in October 1969 in the All India Institute of Mental Health, Bangalore. This is a welcome development.

Clinical psychologists in India do not have a research journal exclusively devoted to the publication of their research. The All India Institute of Mental Health is bringing out a journal, annually, entitled *Transactions* in which work done in the Institute by different departments of Mental Health (including clinical psychologists) is reported. The Indian psycho-analytical society has been publishing a journal, *Samiksha*, mostly devoted to publishing the analytic work done in the Mental Hospital, Lumbini Park, Calcutta and elsewhere, and a few articles on related topics by other psychologists. The other journals in psychology like the *Indian Journal of Psychology, Psychological Studies, Journal of Psychological Researches, Indian Psychological Review, Journal of the Academy of Applied Psychology, Bulletin of the Council of Social and Psychological Research*, Calcutta, are being used for publication of research articles in clinical psychology besides a few of the foreign journals, mostly in U.S.A.

No attempt has been made to bring out books in clinical psychology and for that matter, Indian production of books for the post-graduate level in any branch of psychology, is practically nil. British

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2. Aligarh, Allahabad, Bangalore, Baroda, Banaras, Bihar, Bombay, Gorakhpur, Gujarat, Jabalpur, Jodhpur, Kerala, Lucknow, Nagpur, Patna, Rajasthan, Ranchi, Saugar. In 1968, Andhra University, Waltair, has also introduced Clinical Psychology at the Master's level.

3. It is interesting to point out that the author met an applicant in a Selection Committee for a position in a University Department of Psychology. When the candidate mentioned that he had specialised in clinical psychology, he was asked whether he had seen mental patients. He replied, 'No'.

4. *Souvenir*, the First All India Convention of Clinical Psychologists, held in October 1969, Bangalore, p. 3.

and American books are generally prescribed as texts or reference books for courses in psychology, including clinical psychology.

For purposes of comparability, the categorization, as given in *Psychological Abstracts* published by the American Psychological Association, has been followed in reviewing research in clinical psychology, although a simplified model would have been more suitable.

Psychotherapy

Psychotherapy in a broad sense refers to the techniques of psychological treatment employed in relieving distress. They may range from classical psycho-analysis at one extreme to faith cures at another. But clinical psychologists, at their own inclination, get themselves trained in certain techniques of psychotherapy and use them in treating their clients in face to face situations, either by bringing out certain changes in their attitude or by recommending the manipulation of the environment or both as the cases demand, the main objective being the promotion of the welfare of the client.

The articles published on Psychotherapy are not many. Of these, only a few are based on research. If one were to classify these articles on the basis of types and techniques of psychotherapy, the result would be rather disappointing. No work seems to have been done employing the approaches of Jung, Adler, Rank and other neo-Freudians. Even on orthodox Freudian psycho-analysis, no research has been published during 1960's. Some work using group-therapy is being done in the mental hospital, Bangalore (Murthy, 1959a, Murthy and Satyavathi, 1966). The group activity takes the form of conducting Bhajans, Group Games, Dramas, Music competitions, Sports and other entertainment programmes for the patients in the hospitals. These are conducted rather regularly and it is reported that they have helped the patients in the improvement of their mental illness. Studies conducted on two independent male groups and a female group of schizophrenics using group discussion technique and introducing music etc. have indicated improvement in the adjustment of patients. Two cases of treating a delinquent (Menezes, 1969a) have been reported with favourable results.

Some of the clinical psychologists have shown a more favourable attitude towards the latest entrant in the field of psychological treatment, namely, behaviour therapy. Based on experimental foundations and backed up by researches in the field of learning as influenced by the classical work of Pavlov, behaviour therapy is rapidly gaining ground in curing mental illness, especially, neurosis. As the factor of time and human energy involved in this type of therapy is far less than in analytically oriented psychotherapies and

as the reported percentage of recovery of the cases is much higher than in conventional psychotherapy, the technique of behaviour therapy is becoming popular. Some of the techniques that come under behaviour therapy are: reciprocal inhibition therapy; conditioned reflex therapy; aversion relief therapy; and operant conditioning. An Indian clinical psychologist, Dr. S. S. Anant, has treated cases of drug addiction and alcohol using verbal aversion technique (Anant, 1967; 1968b). His results indicate that behaviour therapy shows 'better results in much shorter time' (Anant, 1968b). He has edited *Readings in Behaviour Therapies*, published in 1969. Quite a few of the foreign behaviour therapists have contributed articles based on their research findings to this volume. Another study reports that nail biting was cured by using reciprocal inhibition (Singh, 1968).

The psychotherapists at the All India Institute of Mental Health, Bangalore, and the All India Institute of Speech and Hearing, Mysore, are showing interest in rising behaviour therapies with cases of speech defects. Two studies in treating stuttering through the use of Cherry and Sayer's technique of masking of perception of one's own voice by a White noise have been carried out in the former institution. The results were encouraging. The results of the investigation in Mysore have not been published. The psychotherapists in the Institute in Bangalore have also tried to treat persons with Writer's Cramp by employing the technique of progressive relaxation, but out of the seven patients, only two continued to take the treatment with success (Moudgil, 1968).

Several factors have contributed to the paucity of research in the area of psychotherapy. The university departments which provide courses in clinical psychology have not been able to initiate research in this field for want of facilities in the form of trained personnel and hospitals with mental patients. In the mental hospitals, the psychiatrists take up the treatment of the cases, following the British tradition, and the clinical psychologist is entrusted mainly with psycho-diagnostic work, including history taking, mental examination and psychometry. He functions mostly as a technician to the psychiatrist, by furnishing a psychological report of the cases. Sometimes, a few clinical psychologists may engage themselves in psychotherapy in collaboration with a psychiatrist or the medical personnel in charge of the team. But very few conduct psychotherapy independently. At best they may engage in psychological counselling. Besides, there are not many medical centres for treating mental patients, with positions for clinical psychologists. The cultural setup in the country is such that people have not yet been sufficiently educated to think in terms of the psychiatric treatment of mental

illness. Consequently the number of patients that visit the mental hospitals at the early stages of the illness are far less than those who visit places other than the medical institutions.

Psycho-Diagnosis

Psycho-diagnostic procedures employed are mainly the same as developed and used in the West. Almost all the psychological tests used by the clinical psychologists are adaptations of those standardized in U.K. or U.S.A. Variations are, of course, seen in the adaptation of foreign tests. Some have taken the necessary precautions in the adaptations of the tests while others have used the same tests, making only minor changes on an *a priori* basis and ignoring the standard psychometric procedures. Norms for the Indian population are lacking for several psychological tests. Many of these tests are in English and, therefore, are inapplicable in testing those with poor knowledge of that language. There are just a few adaptations of foreign tests in Hindi and some other Indian languages. But these are not applicable in other regions of the country where these languages are not spoken. There are not many non-verbal or performance tests which could be used to advantage in clinical work.

An assessment of the psycho-diagnostic work in the light of these limitations may be meaningful. Psycho-diagnosis is concerned with the diagnostic use of psychological tests. Some of its objectives, according to Wolman (1965) are:

(1) to demonstrate the etiological factors;
(2) to differentiate between organic and functional disorders;
(3) to discover the personality reaction of the organism to the disorder;
(4) to evaluate the degree of organic and functional disability;
(5) to estimate the extensity or intensity of the morbid processes in relation to actuarial data concerning type and severity;
(6) to determine a prognosis or probable course;
(7) to provide a rational basis for discussing the case with the patient and relatives;
(8) to provide a scientific basis for classification and statistical analysis of data;
(9) to formulate a dynamic hypothesis concerning the nature of the pathological process and the mechanisms whereby therapeutic effects are explained.

These are the unique activities of the present day clinical psychologists. Considering the background, the research work done by

the clinical psychologists in the realm of psycho-diagnosis is meagre. No work has been published on the diagnostic use of intelligence tests on Indian patients.

A couple of studies have come out using Benton Revised Visual Retention test of brain damage on clinical groups (Shukla, Jha and Misra, 1971). The results have indicated that the performance of the brain damaged subject is much lower than that of the schizophrenics and normals and point out that the test in question could be used for screening the brain damaged.

On the personality side, a few clinical scales have been developed, based on M.M.P.I. items to diagnose schizophrenia, hysteria, mania, paranoia, depression and anxiety (Murthy 1964; 1965d). This was undertaken in the All India Institute of Mental Health, Bangalore. The results have shown that the scales could distinguish the clinical groups from the normals beyond 0.01 level of significance. Kundu's psycho-neurotic inventory and Raman's Neurotic Inventory are the other two instruments which are meant to measure the neurotic tendencies of an individual. Another questionnaire which has been used on the patients in the mental hospital is the one developed by Green and Stacy for measuring hostility and aggression (Prabhu, 1968c). The test has been found useful and there is a suggestion in the article that attempts are being made to get a Hindi version of the test. Maudsley Medical Questionnaire, Cornell Medical Index, Health Questionnaire and 16 P.F. test (Jalota's adaption) are some of the questionnaires which are being used for clinical purposes. Asthana's Adjustment Inventory and Sinha's Manifest Anxiety scale would supplement the tools in this area. De (1955) has reported about the diagnostic use of Word Association Test in differentiating psycho-neurotics from the normals.

Some of the projective techniques have claimed attention of workers in the clinical field. The Rorschach psycho-diagnostics is the one frequently used in the diagnosis of clinical cases. A study (George, 1962) which has come up at the doctoral level is the quantitative approach to the study of Rorschach responses of normals and some of the clinical groups. Using the method suggested by Bower, Testin and Roberts (1960), the quantifiable Rorschach scores have been reduced to three scales, namely, the determinant scale, the thought process scale and content scale and these scales are used for differential diagnosis and prediction of Indian clinical population. The clinical groups which were used for the study were cases of (1) Anxiety reaction, (2) Conversion reaction, (3) Obsessive compulsive reaction, (4) Depressive reaction, (5) Personality trait disturbances, (6) Process schizophrenia and (7) Reactive schizophrenia. Interesting results are obtained and further studies in the area may be rewarding

to develop a differential diagnostic technique. In another study (Kumar, 1961a) Rorschach was used to differentiate psycho-neurotics from normals. The percentage of F was found to distinguish neurotics from normals beyond 0.01 level of significance. When Rorschach was administered to a group of depressives, a few of the Rorschach signs could differentiate between neurotic depressives and psychotic depressives (Kumar, 1962b) and the clinical group from the normals (Kumar, 1960q; 1961a). In another study (George, 1965) in which only animal responses were considered, differences were noticed on the basis of age and sex among normals.

Some of the other projective techniques used in clinical setting are: Bender Gestalt to differentiate the organic from the non-organic cases; Mosaic test to distinguish schizophrenics from normals; and the Szondi test to differentiate the delinquents from the normals. Another test which could be employed for the collection of clinical data is the Indian adaptation of Rosenzweig's Picture-Frustration test. The test with norms is available both in child and adult forms.

The research work in psycho-diagnostic methods is rather sporadic. No consistent effort is made to investigate fully any clinical entity or any of the techniques with all the clinical groups for developing good differential diagnostic techniques. This area deserves the attention of clinical psychologists on a priority basis.

Psycho-Analytic Interpretation

Psycho-analysis has comparatively a long past in India as the Indian Psycho-analytical Society was started 48 years ago. Greater interest was shown in psycho-analysis in the earlier days than at present. About a dozen articles have been listed in this survey. Banerji (1968b) compares psycho-analysis with existentialism. Nekhi (1967) compares it with yoga. Deb (1967) gives the personality pattern of post-polio paralytics from the point of view of psycho-analysis, using T.A.T. for those above 10 years of age and C.A.T. for those below ten, with Bellak's method of interpretation. The investigator points out "that the unconscious guilt feelings and severe super ego's pressure force the libido of the patients to regress from the oedipus level to the oral or pre-oral dependent stage". The psycho-analysis of a case of manic-depressive psychosis (Chatterji, 1963e), obsessional and compulsive psycho-neurosis (Chatterjee, 1964), and of an artist with obsessional symptoms (Chatterjee, 1963a) throws light on the psycho-analytical interpretation of the symptoms, but nothing has been mentioned of their cure. As mentioned earlier, Lumbini Park Mental Hospital seems to be the only place in the

country where training in psycho-analysis is given. The orthodox (Freudian) psycho-analysis is still continuing, probably because of its theoretical importance.

Case Histories

A thesis at a doctoral level may be cited under this category (Jagathambika, 1968). It deals with a case of possession syndrome involving demons. More than 40 cases referred to a private psychological clinic were studied clinically. Using the hypnotic analysis of the cases, it was found that demoniac possession is just a case of multiple personality. Alexander (1956) has made a case study of a girl reportedly possessed by an evil spirit. After analysis, it was found that "identification with the repressed experience assumed the role of evil spirits, because of cultural background and also the help that it gave for the expression of her repressed experience". Another case study (Jha, 1967) reports of the characteristics of the syndrome associated with *anorexia nervosa* of a female patient.

Physical Handicap

An interesting projective technique for use with the blind has been developed, using the tactual and auditory sense modalities (Bhattacharyya, 1968). Twelve items made out of plaster of paris were used for tactual presentation and auditory stimuli of ambiguous nature were given to tap the auditory field. If work be continued in this line of research, a useful instrument could be had to assess the personality of the blind. It could also be used with blindfolded subjects with normal vision. Banerji (1968a) analyzes a case of anxiety about blindness from psycho-analytical point of view and gives the following interpretation: a conflict ensues between his sexual desires and his moral sense, resulting in guilt feeling and apprehension of punishment. Here the visual organ which is responsible for illicit sex gratification is punished in the form of blindness. An attempt has been made to study the personality adjustment problems of deaf and dumb pupils (Mazumdar, 1963). More research in this line is necessary.

Speech Disorders

Two institutions in the country run clinics for treatment of cases in speech pathology and train personnel for speech therapy. One is the All India Institute of Speech and Hearing in Mysore, and the other is located in Nair Hospital, Bombay. A few cases with

speech disorders are often reported to mental hospitals for treatment and the clinical psychologists are gradually showing interest in this area. The personality characteristics of stutterers have been studied by Bharatraj and Rao (1969). Using Eysenck's personality inventory, they found that stutterers score high on neurotic and introversion scales. Prabhu's (1968b) study evinced that 'severe subnormals' as compared to average subnormals had significantly greater speech defects. According to Sexena (1969), personality maladjustment appeared to be one of the chief causes of stuttering. A few attempts are made to treat the cases of stuttering with the use of behaviour therapy (Rathna, 1968, for instance).

Neurological Disorders (Brain damage, Cerebral palsy and Epilepsy)

About nine dissertations and a dozen articles have appeared in this field. Epilepsy has attracted more attention than brain damage. Cerebral palsy has not claimed any attention in so far as published articles are concerned. Epileptics and convulsive subjects have been given the Rorschach, Bender Gestalt, T.A.T. and a few tests of intelligence (Ganguly and Raychaudhuri, 1969; Raychaudhuri, 1970b; Vinoda, 1961; Singh and Virmani, 1969). Raychaudhuri (1970a, 1970b) examines, with the help of Rorschach, short-term as well as long-term effects of anti-convulsive drugs upon personality and behaviour of the epileptics. It was found that the therapy with primidone resulted in a significant improvement in personality-adjustment of the patients. Bender Gestalt was found to be better in distinguishing the epileptics from normals (Vinoda, 1961). Another interesting finding is the responsiveness of epileptics to 'Alpha-rhythms' of EEG. It indicates greater derangement of brain functions in epileptics and poor prognosis (Dey, Chatterji and Majumdar, 1964). A Rorschach study (Ardhapurkar, Mehta and De Souza, 1967) of the cases of ischaemic heart disease indicated that they had, in common, anxiety, depression, features of hypochondriacs and immature personality. The psychiatrists' evaluation of those cases was more or less in agreement with the Rorschach findings. The study of Deb (1961) on the brain injured found that the immediate memory performance of the brain injured was poorer in comparison with that of the familial imbeciles. Varma, Surya, Jindal and Gupta (1965) carried out an investigation on the subjects suffering from headaches. No difference in intelligence (in terms of Progressive Matrices) or personality (Rorschach) were revealed among the subjects suffering from headaches, differentially diagnosed as arising from vascular diseases, tension, hysteria, schizophrenia and neural-

gia. There is greater scope to investigate personality changes, with the use of appropriate psychological tools, before and after neurological treatment of organic cases.

Behaviour Disorders (Drug Addiction and Alcoholism, Suicide, Crime, Juvenile Delinquency)

As in many other areas, most researchers in this field are not essentially clinical psychologists. In this survey, however, the available researches of clinical psychologists have been taken into consideration.

Delinquency in general, and juvenile delinquency in particular, have attracted greater attention from the angle of research. Though there are a few articles which review works searching for the causes of delinquency, articles based on empirical research shed light on the problem in our country.

For the assessment of delinquency a number of tests have been developed. Among inventories, mention may be made of 'D' scale in Mysore Personality Inventory (Krishnan, 1964) and a Delinquency Proneness Scale (Ray, 1964b). Among projective techniques, a verbal projective technique (VPT) has been developed and used for a number of researches (Shanmugam, 1956; 1957a; 1957b). Two studies (Mandal, 1961 and Shankar, 1955) have been made to assess the intellectual level of the delinquents. Mandal (1961) reports that the abstract intelligence of the delinquents is rather low. Shankar (1955) points out that those with low intelligence commit minor offences and those with greater intelligence may commit any crime, with the result that the factor of intelligence may not be of much significance. In his study on tribal delinquency, Kundu (1969) found no difference between tribal and non-tribal subjects on intelligence. The study of Shanmugam and Sundari (1962) with V.P.T. has revealed that non-delinquents are more extroverted than delinquents; but the latter have a greater number of neurotic traits than the former. Two other studies (Rajeswari, 1967; Shanmugam and Govindarajan, 1967) indicate that, as compared with non-delinquents, delinquents have low aspiration level. A psycho-analytic study explains that two cases which were psycho-analysed showed connection between neurosis and delinquency (Chatterjee, 1956). The majority of the investigators agree upon environmental causes like poor homes, over-crowding, rejecting and indifferent parents, illegitimacy, illiteracy, parental and familial conflicts, lack of parental control, bad associations, etc. as causes for delinquency (Ganguly and Maitra, 1966). In his analytic study, Chatterjee (1959) emphasized internal factors in terms of unconscious motives as a cause of delinquency.

Though the boy was brought up in a healthy social environment, he was manifesting anti-social activities like stealing, destructiveness, truancy, and wandering. Psycho-analysis revealed that he had fixation in the oral and oedipal phase of psycho-sexual development. Several of these studies point out multiple causes, rather than any single cause, for delinquency. On the rehabilitation of delinquents, it was found that "personality traits like evasiveness, obstructiveness, lack of frustration-tolerance, marked interest in opposite sex and impulsive attempts at injuring self and others, seem to be present more markedly in the non-adjusted" (Leelavathi and Murthy, 1969).

Raychaudhuri and Maitra (1966) have examined the utility of the Szondi test in the diagnosis of delinquency among juvenile subjects. In another comparative study with normal, convicted and incipient delinquent adolescents Raychaudhuri and Maitra (1965b) sought to find out the Rorschach Test indicators of delinquent behaviour. It was found that more marked differences were in W, D, Dd, S, F+, F−, M, FM, Colour, FK and K responses. Certain unique content categories appeared in the responses of the convicted delinquent subjects. Raychaudhuri, Maitra and Raychaudhuri (1968) compared the biographical and family history data of a group of indisciplined and normal subjects and found such variables as crowding in home, family integrity, parental harmony-discord, etc. significantly related to indisciplined behaviour. A follow-up study of the same group was conducted by Raychaudhuri, Mukerji and Raychaudhuri (1969) using the Rorschach psycho-diagnostic indices of aggression and adjustment. It was revealed that a number of Rorschach signs viz., M−, Blood, mutilated animals/persons etc. characterized the protocols of the indisciplined subjects.

Raychaudhuri and Mukerji (1970, 1971) in two recent studies attempted to relate Rorschach test reflections to homosexuality. The results indicated that a number of variables, viz., reflection, non-texture, non-vista shading, pairs, CF+, C etc. were successful in differentiating the studied groups.

Intelligence and personality characteristics of criminals have also been studied by different investigators. Subnormality of intelligence has often been found to be associated with criminality. Of course conflicting results have also been obtained. To quote Shukla (1958), "most of the studies which go in favour of 'low intelligence theory of delinquency' have been conducted on institutionalised population, which will mean that only those persons were included in the sample who were caught and convicted. The results based on such studies are said to be not valid for whole criminal population".

Mukherji (1968) studied the personality characteristics of a group

of criminals with the Rorschach and the Szondi test. The criminals, as opposed to the controls, were characterized by an id-dominated impulsive pattern, a weak ego and a defective super-ego structure. Basically egocentric, the criminals of this study judged things only by their personal standards. They were found to show signs of intra-psychic conflicts emanating from the oedipal stage. Such other personality variables as aggressive tendencies, feelings of insecurity, poor self-concept, feelings of guilt and paranoid ideas were found to characterize the group. U. P. Singh (1967a) reports that criminals have scored high in neuroticism on the Maudsley Personality Inventory. Another research on the self-concept and social concept of criminals indicates 'that criminals had, as compared to the non-criminals, a lower self-esteem and social esteem, both on desirable and undesirable traits. Lower self-esteem and social esteem are indicative of a lack of self-regard and a self reputative attitude on the part of the criminals' (Sinha and Singh, 1968). Their attitude toward family, parents and authority is more unfavourable than that of non-criminals (Singh, 1967b). According to Kundu and Mukherji (1960), the child of "middle position became the worst victim of unhealthy conditions (viz., negligence, undue punishment, etc.) followed by other positions in the siblingship".

Only a few studies have appeared on the psychology of murderers. Some of the frequently reported causes for murder in Indian setting are disputes over land and finances, infidelity of a spouse or a concubine, long-standing hatred of opposite party members, etc.

A few researches have been carried out on suicide. It was found by Satyavathi and Rao (1961) that, out of a sample of 261 cases who committed suicide, 261 were suffering from either physical or mental illness. Poor economic circumstances claimed 22 cases; family tension, 22 cases; disgust in life, 13 cases; unemployment, 9 cases and drunkenness, 5 cases. Studies on subjects who attempted suicide revealed that they were of sub-average intelligence, extremely hostile and aggressive, with extremes of punitive attitudes and feelings of guilt. Other personality variables that were found to characterize them are: rigidity, die-hard unrealistic goals, and pathological trends (Vinoda, 1965; 1966).

On alcohol and drug addiction, a few studies have been conducted, ranging from survey type, through personality characteristics, to therapy. Jayashankarappa (1969) indicates that, in addition to their dependence on alcohol, excessive drinkers have developed a disturbed neurotic personality with traits of ego-centricity, feeling of loneliness and isolation, introversion, paranoid and depressive tendencies with emotional instability, whereas social drinkers have a more balanced personality. From the point of view of therapy, psycho-

therapy as well as behaviour therapy have been tried independently. The percentage of success seems to be better in behaviour therapy (Anant, 1968d).

Neurosis and Emotional Disturbances

A study on sleep-disturbance and depression reveals that sleep disturbance is the most common symptom in Indian depressives, and depressive feelings as such take the second place as subjective complaints (Ansari, 1968). In one of the two articles on psychosomatics, giving ten illustrative cases, it has been pointed out by Bhaskaran (1955a) that "there are some identifiable patterns in the somatization reactions occurring in psychotic reactive depressions, met in the general hospital psychiatric experience". In an attempt to explain phobia in terms of learning theory, Mehta (1965) shows how, in a female patient, the fear spread from a single red object, by a process of generalisation, to several objects and objective situations. He says: 'One of the reflections bearing on the problem is that emotional elements involved in childhood responses serve as cues for phobic responses. Other is generalisation of drives which is made from one desire to the other'. This study reveals how psychoanalysis and learning theory could be made to supplement each other to the ultimate advantage of both theory and therapy.

Using an inventory and the Rorschach independently, two studies have been conducted to differentiate depressives from normals (Kumar, 1962a; and Kumar and Mathur, 1969). Rorschach signs like R, F, Dr% and P, W%, D%, M, FM, distinguish depressives from normals beyond 0.01 level of significance. In another study, Tavistock self-assessment inventory was used to find out certain manifestations of depressive character traits and symptoms on a population of 100 neurotics (Hazari, 1960). It was found that depressive behaviour pattern is not a single trait or dimension containing a single common general factor, but appears to be a complex of traits containing more than one independent factor. Another interesting study was made on the relationship of separation and depression (Sethi, 1964). The effect of an actual earlier separation on the current depression was studied through dreams, early memories and T.A.T.

Of the various studies on anxiety conducted on normals and clinical groups, only those conducted on the latter groups are considered. It is interesting to note that, in an investigation using 16 P-F questionnaire, the anxiety group presented a pattern similar to 'trait anxiety' (Vagalaxi and Murthi, 1969). An unpublished study regarding the causative factors of neurotic illness in India after

examining in detail 50 neurotics, points out that 'family stresses', 'marital-disharmony', 'inner-conflicts' and 'occupational stresses' are some of the causative factors. Shukla (1966) points out that one factor, 'Role-stresses', has played the most significant part in the causation of neurotic illness. Of the three types of etiological factors considered, socio-cultural factors were significant in 94% of the cases; somatic factors affected 40%; and 14% of the patients had a positive family history of psychoneurosis. Maudsley Medical Questionnaire was used on 50 out-patients of a mental hospital in another study and the most frequently mentioned symptoms of the neurotics were analysed and classified (Bharatraj, Shukla and Kumar, 1967). Another study was made on 'punitiveness and personal disturbance'. It was found that the 'person who is more personality disturbed tends to be intropunitive in the direction of his aggression' (Murthy, 1967).

An experimental study has been done on neuroticism using a reversible perspective figure. The results indicate that the 'rate of perspective reversal is inversely related to the degree of neuroticism' (Sinha and Sinha, 1959).

Psychosis (Schizophrenia, Acute Schizophrenia, Chronic Schizophrenia, Affective Disorders)

Some of the published articles deal with borderline schizophrenia (Bhaskaran, 1959); thought disturbances (George, 1960; George and Prema, 1966); intellectual deficit (Murthy, 1965b); disturbances in communication (Murthy, 1965c) and group therapy with schizophrenics (Murthy, 1959a; Murthy and Satyavathi, 1966). One paper deals with the precipitating factors of schizophrenia and affective psychosis. Another paper attempts to distinguish schizophrenics from the normals on the basis of Mosaic test (Jha, Shukla and Singh, 1968). Haufmann-Kasanin test was used for a comparative study of the performance of normals and schizophrenics and it was found that schizophrenics were unable to form clear concepts and, if formed, they were unable to carry on the same till completion of the task (Myra Devi, 1960). A study on the nature of excitation-inhibition balance in the schizophrenics indicates that schizophrenics react to non-personal stimulation in the same way and to the same degree as do normals (Murthy and Bains, 1965). Both schizophrenics and normals respond strongly to interpersonal stress situations, but the rate of recovery of schizophrenics is significantly lower and different from that of normals. Two studies have been reported using skin potential in chronic schizophrenics as an assessment of arousal level (Mukundan and Murthy, 1969; Mukundan, 1969) showing thereby

that chronic schizophrenics and normals have the same basal level of skin potential. Some work has also been done on ecological factors, order of birth and family size, etc. in relation to schizophrenia. In so far as birth order is concerned, the early born are affected to a significantly greater extent than the later born in both sexes (Sundararaj and Sridhara Rao, 1966b). A demographic study revealed that certain areas had a higher rate of prevalence of schizophrenia than others and 'the density of the population came out as one of the possible crucial factors' (Sundaram, 1967).

The literature on thinking of schizophrenics points out that it is carried on at a primitive, archaic level and is probably characterized by magical belief, paranormal influences and queer ideas of natural and psychological phenomena. But 'the cognitive disturbances at the basis of much bizarre, primitive thinking in schizophrenics are governed by the same principles which determine such distortions in normals' (Murthy, 1959a). An analysis of the paintings of psychotic patients revealed that 'the characteristics usually attributed to schizophrenic and the depressive paintings may not significantly differentiate one group from the other' (Murthy, 1966a).

Mental Health and Rehabilitation

Mental health, generally, implies optimal development of human abilities, optimal growth towards emotional maturity with freedom from neurotic tensions and inhibitions. It also indicates optimal ability to maintain relationships with individuals and groups in accordance with existing cultural patterns. Research on mental health is to be considered from this point of view. Not much work has been done in this area. Anant (1967a) found an inverse relationship between belongingness and anxiety. He had hypothesized that belongingness and self-sufficiency will contribute to one's mental health. Another theoretical paper points out that recreation helps in the alleviation of specific symptoms of patients and provides an opportunity for a creative experience (Bhojraj, 1964). One paper with theoretical discussion indicates that there is a relation between one's occupation and mental health (Bhaskaran, 1966a). Work situations can pose specific conflicts and threats to an individual's personality. Any occupational maladjustment may give rise to psychosis, psycho-neurosis of different kinds triggered by stress associated with work, psychosomatic ailments, anti-social behaviour, addiction to alcohol or drugs, persistent absenteeism, accident proneness and poor work efficiency. A survey conducted on the incidence of mental disorders in Industrial Units in Bangalore (SITRA, 1962) indicates that a considerable proportion of vocational maladjustment

Counselling and Guidance (Marriage and Family, Social Case Work)

As counselling and guidance is one of the branches of specialization in psychology and as the profession is becoming independent of clinical psychology, only such aspects as come into the purview of clinical psychologists are considered here, though a large number of articles and dissertations are listed in the Bibliography.

A volume has been recently published by Fuster (1958) entitled, *Psychological Counselling in India* based upon the research and clinical experience of an active college counsellor. Kapur's (1958) article deals with the psychiatric aspects of educational guidance. Mehta (1962) emphasizes the need to take into account the changing attitudes, values and standards while counselling the young men. Parukh (1959a) points out the importance of inter-personal communication in counselling. In a theoretical discussion, Krishnan (1957b) points out the need to develop a counselling interview, based upon the cultural conditions of the country. He compares Krishna's technique with directive, non-directive and non-authoritarian types of counselling and comes to the conclusion that the former is similar to non-authoritarian counselling.

A few studies have come out on personality in relation to achievement motive. In one of them (Muthayya and Rajeshwari, 1968), the backward and normal children were used as subjects. The results indicated that the normal group is more extraverted than the backward group. On the scale of neuroticism, normal group scored higher than the backward group. The backward group showed a tendency towards a lower mean 'need for achievement' when compared with the normals. In another study by Muthayya (1968), no significant mean differences could be found in the n. achievement of extraverts, introverts, neurotics and normals. Some work has been done by way of investigating marital relationships in Rajasthan (Pareek, 1954). No published articles have been found on marriage and family counselling, as there may not be any clinics for this purpose. Some of them may approach the clinical psychologists and psychiatrists working in the medical centres. But no serious thought seems to have been given for research in this field.

It is rather difficult to isolate emotional problems from educational and vocational problems. All the work done in relation to vocational and educational guidance and also in the field of occupational information would be of necessary help to a clinical psychologist.

Institution and Hospital Care

This area has not been properly explored. There is one theoretical

article on psychiatric nursing in India, pleading for urgent training of more psychiatric nurses (George, 1968).

Hypnosis

One psychologist in the country has evinced much interest in the area of hypnosis. Twelve of his articles listed deal with the factor analysis of a hypnotic scale (Das, 1958a), learning and recall under hypnosis and in waking state (Das, 1961b), learning under hypnotically induced anxious and non-anxious conditions (Das, 1962a), behavioural associates of hypnosis (Das, 1963a), etc. A theory of hypnosis based upon conditioning and inhibition was postulated by Das in 1959. He (Das, 1963b) discusses the nature of *yoga* and *samadhi* and compares the same with hypnosis, mentioning many points of functional and methodological similarity.

Summing Up

Though it is difficult to give a proper evaluation of the work done in the field by numerous research workers, an attempt is made here to present, in a very sketchy manner, the work done in the field of clinical psychology in India. In spite of the fact that no consistent and thorough work has been done so far in any sub-field, whatever work has been done would certainly be to the advantage of future workers in the field. Almost every sub-area in clinical psychology needs further research.

The standardization of psycho-diagnostic tools under local conditions is of urgent necessity; and the development of psychological tools, which are necessary for almost all branches of psychology, may be taken up as a separate issue and research in this direction may be maintained in such institutions where research facilities by way of qualified and enthusiastic men and materials are available.

Immediate attention may be given to the development of research in the areas listed below:

(1) A study of the role of socio-economic, ecological, genetic and cultural factors on the incidence of mental disorders.

(2) An investigation into the problems relating to the education and training of the handicapped.

(3) A study of the personality characteristics of attempted suicides and of homicides.

(4) A study of attitudes towards (a) mental illness, (b) mental hospitals among the rural and urban population in the country.

(5) An investigation into personality disturbances due to induced abortions.

(6) The maintenance of research in the study of different techniques, both in psychotherapy and behaviour therapy, for children as well as adults, to deal with their problems.

(7) Investigation of the influence of the factors like aggression, anxiety, etc. on working situations.

(8) A study of the psychosomatic and somato-psychic aspects in functional and neuro-psychiatric disorders (with an emphasis on the role of stress).

(9) Evaluation of training programmes of clinical psychologists, with supervised practicum facilities in the universities.

(10) Encouraging the attempts at the taxonomic approach for the study of behaviour disorders on the basis of:

(a) Syndromes model,

(b) Multivariate analysis,

(c) Level of consciousness model.

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2

Developmental Psychology

A Trend Report

By

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Introduction

The human organism is continuously developing from the time of conception to late maturity. The development process unfolds itself through the years of growth and folds itself towards the later years. This process has a certain uniformity no doubt. But it also shows diversity and variation from group to group, home to home and individual to individual. The whole phenomenon is dependent on a variety of factors the exact number of which is perhaps yet undetermined. In view of this, there is little surprise that developmental psychology is the least organized of all branches of psychology. Perhaps, it is even a misnomer to call it a branch. Moreover, research in developmental psychology calls for a basic orientation which is different from the orientations of psychologists working in other branches. The developmental psychologist is interested in the entire life span and in all aspects of behaviour and more so, in their inter-relationship. This orientation is different from that of an industrial or an educational psychologist whose scope of investigation is limited by the context of behaviour and temporal relevance. These specialized branches of information are closely related to research on development, no doubt. But their direct interest is much narrower, more specific and time-bound. It is because of this, perhaps, that research in developmental psychology has, in recent years, lagged behind to some extent. The developmental psychologist has to specialize himself in generalities whereas the psychologists in other branches have to specialize themselves in specific directions.

Importance of Developmental Psychology

Developmental psychology perhaps forms the foundation for all branches of psychology. It has significance, both in the development of the science of psychology and in the application of psychology. The first point is obvious. It is accepted by everyone that the behaviour of an individual at any point in his life is very much the result of his past behaviour and also of the present developmental stage. Understanding or explaining the behaviour of an adult or an adolescent is impossible without taking into account his developmental history. This becomes more apparent in the clinical situation. From the point of view of application of psychology again, knowledge of the development of different psychological processes and also of the developmental stages of the subjects is important. This is vital for our programmes on the induction of social and behavioural changes. In introducing a particular social change, it is necessary to have information on the social, intellectual and emotional development of the people. These factors should largely determine our modes of communication, goals of change, and also mechanism of operation of the programmes. Thus developmental psychology serves as a bridge where research in experimental psychology and that in applied psychology meet. Incidentally it is also the board from which these two should spring.

The Need for Promoting Research in Developmental Psychology in India

In view of what has been stated above, the need for developing and promoting research in this area becomes obvious. We are now going through a heavy programme of planned change, especially in the area of education. New ideas along with newer methods are to be introduced into the educational system. Their success rests upon a sound and scientific knowledge of the developmental processes. The existence of wide variations in social, economic and cultural backgrounds makes this all the more imperative. The introduction of guidance and counselling programme again demands the acquisition of data on the developmental aspect.

Nature of Research in Developmental Psychology

Developmental psychology is very loosely defined. It embraces almost all other branches of scientific psychology. Child psychology, adolescent psychology, general adult psychology, psychology of senescence, all fall within the purview of developmental psychology.

Again, experimental psychology, social psychology, psychiatry and clinical psychology have contributed a good deal to developmental psychology. In view of this wide area, it becomes necessary to prescribe some restrictions in classifying studies as belonging to the area of developmental psychology. For the purpose of this review it was decided to characterize as developmental only those studies which have been planned with the developmental orientation or developmental frame of reference.

The Developmental Orientation

The developmental orientation implies the following assumptions:

(1) Various aspects of behaviour develop continuously and the process of growth and development proceeds in a sequence of imperceptible changes unless observed over a considerable length of time.

(2) Different aspects of behaviour develop at different rates and are influenced by a wide variety of factors—hereditary, constitutional, environmental and accidental.

(3) Different aspects of behaviour show their inter-relationship (e.g. language development and social development).

Some research workers have followed the stage approach which assumes that the developmental sequence can be segmented into different stages like infancy, childhood etc. This approach assumes, though implicitly, that each successive stage can be distinguished clearly from the preceding and following stages. Other workers have preferred to avoid this approach and studied different aspects of development independently and as a continuum, rather than divide it into stages. A third group of researches in developmental psychology have their origin in specific developmental theories, notably the work of the psycho-analysts, Piaget, etc.

Some Characteristics

Researches in developmental psychology can be characterized on the basis of their approach, purpose and methods. Thus they can be classified as normative or theoretical. The former includes all those investigations which have been undertaken with the purpose of establishing developmental norms. Notable examples are the Harvard Growth Studies, Gesell Developmental Study and the Developmental Norms Project of the National Council of Educational Research and Training (N.C.E.R.T.) India. Theoretical studies include those studies which are focused on the role of various independent variables on different aspects of development. The twin control

studies, studies on the influence of orphanage environment, the role of parental attitudes, socio-economic variations etc., belong to this category. Still others, like those of Piaget, were meant to develop a complete theory of development.

From the point of view of methods, investigations can be classified as observational, experimental, survey type, cross-cultural, clinical and case-studies.

Further, developmental studies can also be classified as general or specific. General investigations are those which attempt to study a number of aspects of development in a single investigation whereas specific studies have concerned themselves with specific aspects of behaviour. An example of the former is the Developmental Norms Project of the N.C.E.R.T. Of the latter, there are many.

Some General Observations on the Studies under Review

In the light of the above observation it may be worthwhile to attempt a general evaluation of the studies done in India in the field of developmental psychology. It must be mentioned that the studies reviewed here do not perhaps exhaust all the studies carried out in India. Only those investigations which have been published in leading Indian journals or publications of individual institutions have been included. Studies abstracted and included in various conference proceedings have also been included. Although it may be stated with a fair amount of confidence that not many studies have been left out, no claim is made that every single investigation falling in the above categories has been covered. In fact, such an exhaustive report is not possible within the time available to the reviewers. Though this would have been desirable, it was felt that such an exhaustive report was not essential for the purpose of the review. Some broad observations on the studies covered in this Report would be in order:

(1) At the outset, it must be admitted that very few studies were found to be developmentally oriented. Most of the studies were characterized as studies of high school boys or studies of college students etc. The orientation in these studies appears to be more of convenience and availability of subjects. There are only a few exceptions to this, such as the N.C.E.R.T. Project (not included since unpublished) and the infant studies at the Child Development Faculty, M.S. University, Baroda, (Verma, *et al.*, 1969).

(2) Most of the investigations cannot be classified as cross-sectional or longitudinal. A large majority of them have been concerned with some isolated groups like nursery children between the ages of 4 and 5. This again shows the lack of a developmental frame of reference.

(3) Most of the studies could be called as fact-finding because they have been concerned with studying the role of different environmental or familial variables on specific aspects of behaviour like adjustment, language, development. At the same time, very few of the studies, perhaps none, have been based on specific theoretical models. Very few of them have attempted even to postulate specific hypotheses. Most of them are descriptive of vague discussions of data collected with loosely designed methods on badly selected samples. Of course, most of them indulge in deriving *a posteriori* explanations.

(4) Very few of the studies have been comprehensive. The only exception perhaps is the N.C.E.R.T. Project on the Developmental Norms for Pre-school children. Other investigations have been concerned with very specific areas of behaviour.

(5) From the point of view of methodology, most of the studies appear to belong to the survey type. Experimental studies are conspicuous by their absence. A few studies have employed the observational and case history method.

(6) Most of the studies have been based on highly localized incidental samples which perhaps do not warrant generalization even for the population of the small town from which the sample is selected. The samples have been mostly drawn from the lower middle, middle and upper middle income groups of the urban areas. Very few investigations have been carried out on rural, agricultural and non-school-going samples.

Table I presents a classification of the studies under review according to the developmental stage studied and the specific aspects of behaviour examined.

It can be seen from Table I that out of 122 investigations about which information was available, 49 are related to childhood. Out of 16 studies listed under adulthood and old age, only one or two are on old age and the rest are on early adulthood, mostly under 25 years. This shows that there have been very few studies of behavioural development after the age of 25. A majority of studies on adolescence are on High School Subjects and it is not definite how many of them were actually adolescents. Childhood thus appears to be the stage of maximum concentration of research.

Considering the different area, intelligence, emotionality and adjustment and personality account for more than 60 per cent of the investigations. The areas of personality and adjustment have been used by investigators overlappingly. Emotionality and adjustment thus appears to be the area of maximum concentration. The number of investigations in physical development, learning, parent-child rela-

TABLE 1

S. No.	Aspects studied	Infancy	Childhood	Adolescence	Adulthood & old age	Total
1.	Physical development	1	1	—	—	2
2.	Learning	—	1	1	1	3
3.	Intelligence	1	11	9	—	21
4.	Emotionality and adjustment	1	10	20	5	36
5.	Personality	2	6	17	1	26
6.	Interests	—	2	7	4	13
7.	Attitudes	—	3	5	2	10
8.	Abilities	—	6	5	1	12
9.	Social and Moral development	—	4	4	1	9
10.	Parent-child relations	—	2	—	1	3
11.	Special problems	—	3	1	—	4
	Total	5	49	69	16	139

N.B. The actual number of studies under review is only 120. The inflation in the grand total is due to multiple classification of some of the studies.

tions, etc., is very small. The table, therefore, clearly indicates the areas where more investigations are needed. It may also be observed that very few studies have attempted to study more than one aspect. This has deprived us of the opportunity of studying the inter-relationships among the different areas.

Parent-child relations which have been extensively investigated in the U.S.A. has received little attention from Indian research workers. The area of attitudes and attitude development which is important for purposes of introducing social change and for studying inter-group tensions has also not received adequate attention. The very small number of investigations in the area of physical development is really striking. In this area, no special tools need to be designed. Data are perhaps available in school and hospital records. But no attempt has been made by psychologists to make use of these data. Equally surprising is the number of investigations in the area of learning.

Thus, one can easily see the urgent need of initiating research in some of the areas and also to undertake research simultaneously in more than one area.

Table 2 shows the details regarding the methods employed in the different investigations.

It may be observed from Table 2 that only two investigations are longitudinal—Gupta (1945) and Verma *et al.* (1969), all other studies

being cross-sectional. This clearly shows the need for more longitudinal investigations which, on the whole, have been found to provide reliable and valid information. It will also be seen that the highest number of investigations have employed personality inventories and questionnaires, followed by psychometric tests of intelligence and ability. Interest inventories have been employed in 24 investigations although this is not shown separately in the table. Experimental and observational methods, case study techniques and projective tests have been employed in a few investigations.

In many of these instances where personality inventories were employed, rough and ready techniques of adaptation have been followed. One cannot help the feeling that more emphasis should be placed on experimental, observational and case study methods.

TABLE 2

Method	Infancy		Child-hood		Adulthood Adolescence & old age				Total
	L.	Cr.	L.	Cr.	L.	Cr.	L.	Cr.	
1. Experimental	—	—	—	3	—	3	—	3	9
2. Observational	1	2	—	7	—	—	—	—	10
3. Case study	1	—	—	2	—	1	—	—	4
4. Psychometric tests	1	1	—	15	—	15	—	1	33
5. Sociometric tests Personality inventories and Questionnaires	—	—	—	21	—	42	—	14	77
6. Projective tests	—	—	—	9	—	9	—	—	18
7. Interviews	—	—	—	2	—	1	—	—	8
8. Others	—	—	—	—	—	—	—	—	—
Total	3*	3	—	59	—	71	—	18	159**

* The actual number of longitudinal studies is only two. One study Verma *et al.* (1969) has been classified both under observational and psychometric methods.

** The increase in grand total is due to classification of a few studies under more than one category.

Table 3 shows the sampling procedures employed in the various investigations.

It is found from Table 3 that the sampling procedures employed leave much to be desired. The samples in most of the investigations were selected on an incidental basis. Scientific procedures of random or stratified sampling have been employed only in six investigations. Two studies have not mentioned the sampling procedure employed.

TABLE 3

S. No.	Type of sample	Infancy	Childhood	Adolescence	Adulthood & old age	Total
1.	Incidental	3	41	57	16	117
2.	Random sample	—	—	5	—	5
3.	Stratified	—	—	1	—	1
4.	Individual studies (single subject)	1	3	—	—	4
5.	Selective	—	—	1	—	1
6.	Not reported	—	2	—	—	2
	Total	4	46	64	16	130

N.B. The actual number of studies is only 122. The increase in grand total is due to multiple classification of some studies.

Reading Table 2 and Table 3 together, one can easily see the utility of the researches under review. From Table 2 it is found that most of the investigations were of the cross-sectional type and from Table 3 it is found that sampling procedure employed in most of the studies have been far from satisfactory. Most of the investigations under review thus turn out to be imperfect cross-sectional studies. It is needless to point out that the validity of cross-sectional studies is essentially dependent on satisfactory sampling. Perhaps, this points to the more fundamental defect generally characteristic of all the studies under review, viz., lack of developmental orientation. Even studies which have attempted an analysis of age trends have followed the procedure of selecting a large group of subjects and subsequently breaking them down into different age groups, little worrying as to whether the samples at different age levels are comparable. Four of the studies, viz., Gupta (1945), Nagaratna (1939), Pathak (1966), and Verma, *et al.* (1969) have been on single subjects.

Table 4 gives the details of the area sampled.

Here again, it is found that 9 investigators (Chaterjea, 1961; Chatterjee, 1939; Deo, 1964; Deo, 1965; Deb and Ghose, 1962; Dhillon, 1968; Ghose, 1941; Hoyland, 1926) have not reported the area sampled. None of the investigations under review has used a nationwide sample. The only investigation (not included in the review, being unpublished) where an attempt has been made at nationwide sampling is the Developmental Norms Project of the N.C.E.R.T. Nine investigations (Bose, 1966; Faizunnisa and Parameswaran, 1965; Faizunnisa and Parameswaran, 1968; Reddy, 1967; Reddy, 1968; Reddy, 1969; and Tamhankar, 1968) have employed City as the sampling unit, while 96 studies have employed one

or few institutions as the sampling area. These figures again point to the very restricted applicability of the findings of the investigations under review. It must be pointed out, however, that the problem of getting at the right sample presents considerable difficulties. A general insensitivity or apathy on the part of the public towards psychological research and, in some instances, even their positive resistance, act as restricting factors. Another difficulty is that basic data like date of birth, socio-economic status, etc., are not readily available. This is true especially of the rural areas where no record of the date of birth of children is available.

TABLE 4

S. No.	Area of sample	Infancy	Childhood	Adolescence	Adulthood & old age	Total
1.	Villages	—	2	2	—	4
2.	Local (one or few institutions)	3	34	47	4	96
3.	City	—	3	6	—	9
4.	State	—	1	6	—	7
5.	National	—	—	—	—	—
6.	Individual (Single subject)	1	3	—	—	4
7.	Not reported	—	3	4	2	9
	Total	4	46	65*	6	129**

* One study (Bagh, 1958) under adolescence has covered both villages and local sample.

** The increase in the total is due to the classification of some studies under two stages of development.

A summary view of Tables 1, 2 and 3 thus leads us to the conclusion that the studies under review fail to satisfy our expectations on all counts, viz., aspects of behaviour studied, methods employed and sampling procedures. This is not to deny that there are a few investigations which pass the muster on all or some of these criteria. But, on the whole, the bulk of the research reviewed appears to have been an exercise in data collection and *ad hoc* interpretation which can only have a very limited utility.

Some Suggestions for Planning of Research in the Area of Developmental Psychology

Our examination of the researches under review leaves us with the overall impression that little by way of organized research has

been carried out in India in the area of developmental psychology and that sound research in this field is yet to start in our country. The drawbacks already mentioned call for a careful examination of the following aspects of the researches to be proposed:

(a) Studies on different stages of development
(b) Studies on different aspects of behaviour at each stage
(c) Sampling problems
(d) Methodological problems
(e) Theoretical versus normative studies.

Studies on Different Stages of Development

As already mentioned, studies on childhood and adolescence far outnumber studies on other stages. Investigations on infancy and old age are very much lacking. These two areas are important both from the point of view of academic interest as well as of practical utility. With increasing control over diseases and rising standards of nutrition, we may very well expect an increase in the proportion of older people in the total population. In addition, the factors of urbanization, breaking up of the joint family, etc., can lead to an increase in the special problems of old age. Further, from the point of view of introducing social changes, considerable significance is attached to the study of the older generation, the nature of their learning process, their value system and emotional conditions.

Although investigations on adolescence and childhood are far more numerous than in other areas, they have not helped us very much to understand the Indian child or the Indian adolescent. It is needless to point out the importance of these two stages. Children and adolescents are our future citizens and planned changes in education have direct impact on them. The phenomena of youth unrest concerns them directly. Changes in social attitudes and values which are necessary to make them responsible citizens of a secular democratic society have to be brought about during this period. In view of these considerations, controlled, scientific and sustained research in childhood and adolescence is of vital importance. Further, very little information is available on the psychology of the rural child and rural adolescent. With more and more of rural youth migrating to cities and with more and more rural areas getting urbanized, the importance of studying the rural child and the rural adolescent cannot be overemphasized.

Studies on Different Aspects of Behaviour

Another point which was obvious from the review of the research

was the relatively uneven distribution of studies among different aspects of behaviour. Most of the studies under review related to emotionality and adjustment. While the importance of these areas is not to be denied, cognitive development, intellectual development, social development and development of interests deserve more attention, both individually and in their inter-relations. In view of the social problems of our country and the need for inculcating new social values on the one hand and reshaping the education system on the other, investigations in the area of learning, intellectual development and development of social values and attitudes are of vital importance. Physical development ranks only next to these in order of importance.

Sampling Problems

As already mentioned the sampling procedures employed in the studies under review are anything but acceptable. In many cases, the samples were imperfect and highly localised. To build up a psychology of the development of personality, investigations based on nationwide sampling, stratified for different socio-economic variations, are necessary. It is not necessary that these should be centrally sponsored monolithic projects. It is possible to have parallel and comparable investigations in different parts of the country based on mutual communication and discussion among research workers.

Methodological Problems

Methodological problems are of two types. The first type refers to the design of the investigation, namely, longitudinal or cross-sectional. The second type refers to the choice of the specific research techniques and tools.

(1) *Longitudinal versus Cross-sectional*: It cannot be denied that longitudinal investigations provide us with the best possible information on developmental process. Longitudinal studies of subjects through the entire life span are perhaps the ideal. But the practical difficulties are obvious and the time involved rules out the possibility of taking up such investigations on a large scale, especially in view of the urgent need for research on psychological development. Cross-sectional researches on the other hand, though valuable in their own right, do not provide information which is as valid as longitudinal studies. A combination of both the approaches appears to be the best. The only solution seems to be to launch on a series of sequential longitudinal investigations. For example, longitudinal investigations can be launched simultaneously on the following age

ranges for the stages of childhood and adolescence.

(i) 1 to 5 years Early childhood
(ii) 6 to 11 years Late childhood and
(iii) 12 to 20 years Adolescence

For higher age groups, the cross-sectional approach may be adopted. A number of simultaneous longitudinal studies will give us valid data on the crucial first 20 years of development in a short period of about 10 years. The cross-sectional studies on higher age groups can also be started simultaneously. Care must be taken, however, to make the sequential samples representative and comparable.

(2) *Techniques and Tools*: Personality inventories, interviews and psychometric tests have been found to be the most popular techniques employed in the researches under review. Experimental investigations, case-studies and controlled observation have been found to be used rather sparingly and yet these latter techniques can provide more meaningful data. Further, the personality inventories and psychometric tests employed have been readily borrowed from foreign sources with little care as to their suitability for the local population. It is, therefore, necessary to take up proper standardization of appropriate tools on representative samples.

Theoretical versus Normative Studies

From a practical point of view, normative developmental studies claim our attention first. But in the long run, findings of normative investigations have to be fitted into a theoretical model. It is highly regrettable to find that the proportion of theoretical studies has been very negligible. Theoretical studies are important, not only from the point of developmental psychology, but also from the point of view of the whole field of psychology. Ultimately it is the theoretical investigations that will determine the value of the practical utility of normative studies also. Hence theoretical investigations deserve encouragement in their own right.

Suggestions for a Programme of Research

In the light of foregoing observations, the following programme of research is suggested in order of priority:

(1) Launching simultaneously longitudinal investigations on the following age groups in a number of centres distributed evenly among the various parts of the country:

(i) 1 to 5 years
(ii) 6 to 11 years and
(iii) 12 to 20 years.

The emphasis in these investigations should be on (a) intellectual and cognitive development; (b) development of social and moral attitudes; (c) physical development, and (d) deviant behaviour. This order of priority is suggested from the point of view of practical utility and application of the findings of research. The importance of the areas of intellectual and cognitive development, especially during the early years of life, is obvious from the point of view of education. Next in importance is the area of social and moral development. The terms cognitive development and intellectual development are employed here in their widest sense to include the development of concepts of different types, numerical, spatial etc. Similarly, the development of different types of interests will also legitimately fall in this area.

It may be pointed out that it is perhaps not very wise to consider the different areas of development separately in view of the fact that the organism develops as a whole and that the different developmental processes are inter-related. But it may be pointed out that investigations purporting to study the development process as a whole are likely to be very time-consuming. They also present several other difficulties. Hence the limited recommendations made above.

It is needless to point out that the developmental processes have to be studied as related to socio-economic variations, rural-urban variations and several other factors that may influence the process of development. Research into the influence of child rearing practices on different aspects of development will be of special interest.

It should be pointed out that almost all the investigations have been carried out on urban school going subjects. In view of this, research on non-school going subjects assumes importance. Mention may also be made of the importance of investigations on tribal subjects because it is a major national problem to bring the tribal population into the main stream of the national life.

(2) There is also a great need of cross-sectional studies on the higher age groups with reference to (a) decline of abilities (learning and sensory), (b) emotional development and problems of adjustment and (c) social attitudes. As already pointed out, research on the aged has been very meagre. But the importance of research in this area is obvious in view of the fact that life expectancy is on the increase and the pattern of families is changing from joint to single.

(3) While normative type of research should get the highest priority, the importance of theoretical investigations should not be underestimated. Individual theoretical investigations should therefore be promoted in the universities by providing special research

fellowships in developmental psychology for doctoral and postdoctoral students. Two lines of work suggest themselves. The first is that of Piaget on language and thought development. This is vitally connected with the cognitive development of the child. The second approach may be based on Erikson's model of identity formation. This is all more the important in assuring overall personality development.

Some Individual Investigations

Before concluding, it was felt necessary to offer brief notes on a few good investigations in this field. In selecting these investigations, the following criteria were kept in mind:

(i) Investigations planned and carried out on an All-India level and investigations forming a sequence relating to the same problem were included.

(ii) In addition, the investigations which were unique and different from most others in their scope and method were also included.

Such a selection was felt necessary to identify areas where research already conducted could be followed up with advantage.

Infancy: The one attempt which deserves special mention is the Baroda Study at the Department of Child Development (Verma *et al.*, 1969). This study represents a serious attempt at a longitudinal study of infants. This study, it is felt, may be expanded in its scope to include all aspects of development and undertaken on a national basis. The study by Pathak (1966) at the same centre also deserves mention.

Childhood: The one investigation which deserves special mention is the Developmental Norms Project sponsored by the Department of Psychological Foundations of the N.C.E.R.T. (Muralidharan, 1970; Muralidharan and Topa, 1970). The project was undertaken simultaneously at seven centres: Madras, Calcutta, Bombay, Delhi, Ahmedabad, Allahabad and Hyderabad and involved urban, semi-urban and rural children between ages of $2\frac{1}{2}$ and 5. Thus an attempt was made to study a representative sample of the entire population even though the number of children studied at each age group may not be considered adequate. The investigation combined the cross-sectional and the longitudinal approach and was comprehensive in its scope, covering a study of adaptive behaviour, language behaviour, motor behaviour and social-personal behaviour. The results are still under analysis. It may be mentioned that this series of investigations marks a welcome change in the direction of normative research on Indian children. It is felt that these investigations deserve a careful examination and should form

the basis for planning the longitudinal and cross-sectional researches suggested for the future.

The investigations of Khatri (1965a, 1965b, 1965c, 1968, 1969) on the psycho-dynamic aspects of the child's life in the family and its relationship to development are also worth noting. They attempt at combining the clinical depth approach with the normative developmental approach.

The investigations by Faizunnisa and Parameswaran (1965, 1968) and Iffatunnisa and Parameswaran (1965) represent a similar attempt to relate the dynamics of parent-child relationships to the development of behaviour problems in children.

Adolescence: Sustained and organized research on adolescence has been conspicuous by its absence. Most of the investigations, as already pointed out, have failed to adopt a developmental orientation and have concerned themselves with High School Children. Individual investigators, however, have been carrying out investigations some of which are worth mentioning. The investigations of Reddy (1966, 1967a, 1967b, 1968, 1969) and Parameswaran (1957, 1963) deserve a special mention in this context. Similarly, the investigations of Shanmugam (1952, 1953, 1955, 1956) on adolescents of low income group constitute a sustained and noteworthy attempt in this area.

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3

Educational Psychology

A Trend Report

By

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Introduction

THERE HAVE been some attempts either by individual workers or research institutions to review the research work done in the field of educational psychology or in a specific branch or area of this subject. The National Council of Educational Research and Training (NCERT) has published titles of Ph.D. theses in education and M.Ed. dissertations or theses carried out in Indian universities during the period 1939 to 1966 (NCERT, 1966a & 1968b) and also published the *Third Indian Year Book of Education—Educational Research* (1968c). Pareek (1968) has complied the titles of research articles in behavioural sciences during the period 1925 to 1965. Krishnan (1961) and Sukhia *et al.* (1963) have reviewed the work done in psychology during the period 1950-60. Kuppuswamy (1968) and Deo (1968) have also reviewed the work done in certain specific areas of educational psychology. The present survey aims at reviewing the research done in educational psychology in India with the definite purpose of locating gaps in research and suggesting suitable problems for further research. To realise the objectives in view, the survey is confined to present a synoptic view of the research in educational psychology rather than minor details of each and every study and to identify areas where research needs to be undertaken.

Educational Psychology in India

The first Department of Psychology was established in the University of Calcutta in 1915. The first college of Education

was, however, established at Madras more than 100 years ago. The teaching of Educational Psychology began in colleges of education in India right from the establishment of the first training college; but, being an applied branch of psychology, it never attained importance on its own merits in faculties of education, nor did it get adequate recognition in the departments of psychology. The University Grants Commission appointed a Review Committee on Psychology under the Chairmanship of Dr. B. Kuppuswamy in March 1961. A perusal of the report of this Committee indicates that Educational Psychology is included among the compulsory papers at M.A. level only in the University of Calcutta. Lucknow University offers courses in learning, problem solving and motivation. It thus appears that one of the reasons for the paucity of research in Educational Psychology is the low priority given to it by the Psychology departments of Indian Universities.

Educational Psychology is an important ingredient in the education of teachers. The expansion of formal education will require increasing number of teachers in class-rooms; and if the quality of education is to be maintained or improved, adequate steps will have to be taken to train teachers effectively, and to that end, to create a fairly developed and an up-to-date science of Educational Psychology.

Areas included in Educational Psychology

In the present survey, the classification adopted by the American Psychological Association in 'Psychological Abstracts' has been followed. The review is thus limited to the following eight areas included in educational psychology:

(1) Attitude and adjustment;
(2) Testing;
(3) Physical education;
(4) Special education;
(5) Educational and career guidance;
(6) Personnel;
(7) School learning and achievement; and
(8) Teaching methods.

The review is confined to research work done at the doctoral and post-doctoral levels and reports published in journals, brochures, bulletins or books.

I. Attitudes and Adjustment

A perusal of work done in the area of attitudes and adjustment *Research* (1968c). Pareek (1968) has compiled the titles of research

compels one to remark that most of the work done in this area is of an elementary type. No centre or institution has undertaken sustained work in this area over a period of time.

Attitudes

The attitude of students towards various school subjects, school activities, religion and social conventions, vocations etc. have been studied. The researchers have mostly used either 'Thurstone's technique' or 'Likert's technique' for constructing the attitude scales. Among these, studies of students' attitudes towards 'Democracy and Education' by Ahluwalia (1965), 'Caste and Social Problems' by Ojha (1968), 'Controversial Educational Issues' by Sinha and Roy (1959), 'Motion Pictures' by Panda and Kanungo (1962), 'Religion, the Spiritual and the Supernatural' by Adinarayan and Rajamanickam (1962), 'Compulsory N.C.C. Training' by Pillai and Feroze (1966), 'Compulsory Military Training' by Singh (1968) and towards 'Shramdan' by Kale (1970) are worth noting.

A second group of studies centres around the attitudes of university students—undergraduates and post-graduates. Dass (1958) studied the effect of westernization on university students' attitudes towards co-education. Kale (1961) attempted to measure linguistic social distance among post-graduate students of the University of Bombay with a unidimensional and highly reliable scale. He continued this work till 1967 when a report of further studies in this area was presented at the Indian Science Congress. Muttagi (1963) has investigated the cross-community attitudes of under-graduate and post-graduate students of the Bombay University. Kothurkar (1962) made a psychological survey of the secondary school children of Poona. Roy (1967) surveyed the social integration attitude of the post-graduate students towards westerners. Rath (1959) compared the attitudes of two samples of college students in Orissa on some cultural and educational issues after an interval of four years. Attitudes of Indian adolescent girls has been studied by Weisinger (1964).

Maria and Bennur (1969) have reported a study regarding the relationship between sex, standard choice, electives and attitude towards religion among high school pupils. Malatesha (1969) sought to find out whether any significant change occurred in the attitudes of boys towards modernization as they passed from high school to college. There are at least two studies to find out whether teaching methods or achievement have any impact on pupils' attitudes. Bennur (1968) presents the results of an experiment carried out to see the effect of methods of instruction in improving intercaste attitudes. He concludes that discussion technique rather than lec-

tures induces students to take more boys from other castes as friends. A study by Joshi and Sharma (1969) reveals that students with more than average achievement have more socially acceptable moral attitudes than average and below average students. Aaron (1969) studied the attitudes and motives of teachers and pupils. His study indicates a significant correlation between the attitudes and achievement motives of teachers and pupils.

A few studies have tried to relate attitudes towards school subjects to achievement in those subjects, or attitudes towards teacher, punishment or homework, to achievement in school examinations.

Teacher Attitudes

A few studies deal with the attitudes of teachers and teacher-trainees. Some of these studies simply survey the attitudes of teachers whereas others study the attitudinal changes as a result of training.

Buch (1959) surveyed the attitude of teachers towards the profession. The results indicate that, in general, training has a favourable effect on the attitudes of teachers towards their jobs, except when experience exceeds five years after training. The female graduates are more favourably disposed than the male graduates and that, in the cases of male teachers, the level of formal education before training is inversely proportional to the favourableness of attitude. Aggarwal (1966) has found in a similar study, that teachers have a favourable attitude towards the profession and that factors like 'designation', 'age', 'sex', and 'experience', do not influence the attitudes. In a study with a sample of 422 trainees, Ponnambalam and Visvesvaram (1966) found no significant relationship between the attitude of trainees and their educational, occupational and economic status. Kakkar (1970) studied the impact of the teacher training programme upon the attitudes of undergraduate trainees towards children but could find no noticeable change in the trainees' attitude at the end of the training period. Singh (1966) studied the attitudes of training college lecturers towards extension services department. Kakkar (1970) and Dosajh (1970), among others, have also studied the changes in attitudes of trainees as a result of training.

Most of the studies aim at finding whether the attitudes are favourable or not or they look for changes in attitudes through a treatment. No one has tried to find suitable programmes or techniques to change the attitude in a desirable direction.

Adjustment

Several studies have been reported in the area of school, home

and personal adjustment of high school and college students of both sexes. Some studies try to relate adjustment with variables like intelligence, achievement, age, sex, socio-economic status, needs, anxiety and insecurity. Student reaction to frustration has also been studied. A few studies focus on the nature, causes and extent of indiscipline among students. The relation between indiscipline and variables like achievement, participation in co-curricular activities etc. is also examined.

Shah (1965) has studied the problems of discipline by taking attitudes of pupils towards home, teacher, school, etc. as independent variables. She concludes that the problem of discipline in schools is positively influenced by pupils' attitudes, though a large number of other factors also contribute to this problem. Raychaudhuri, Maitra and Raychaudhuri (1968) showed how the students' intrapsychic pull towards indisciplined behaviour is conditioned and determined by the social-environmental field forces and stressed the need for more elaborate clinically oriented studies.

A few studies are devoted to the problems of university and college students. These include 'Adjustment Problems' by Rao (1967a, 1967b); 'Personality Adjustment of Engineering and Medical Students' by Pal (1968); and 'Personality Adjustment Pattern of Post-Graduate Male Students' by Kundu and Mitra (1969). Natraj (1966) studied sex differences in neuroticism among students. Studies in the same or allied areas have been undertaken by Mohanty (1967) and Devi (1969). Dev and Bhagia (1968) studied sex differences in self-acceptance of Punjab University Students.

Personal problems and adjustment problems of adolescents have been studied by Ahluwalia (1969) and Kakkar (1967) who have underscored the need for a global approach to the problem.

Natraj (1968) studied the "extent to which adolescent college girls who are subjected to stresses and strains, can adjust to different aspects of environment". Nanda (1957) and Mehta (1968) explored the psychological and the felt needs of girls in adolescence.

Rao and Patil (1968), Bhagia (1968) and Hiregange (1970) have all studied the adjustment problems of high school boys. Sapra (1967) inquired into the social adjustment of the Government of India merit scholars in Public Schools. Bayti (1969) investigated into the leader behaviour characteristics of school pupils. Nijhawan (1968) and Patel (1961) studied adjustment of children. The former found significant relationship of children's age, parents' income and occupations to observed patterns of nursery school behaviour whereas the latter studied family adjustment and economic status as related to some character traits in children and found "a significant correlation between the nature of the child's

family relationships and character traits developed in the child". Family relationships also appear to depend upon socio-economic status, though paradoxically, character traits seem to be independent of it.

The pattern of adjustment of high and under-achievers has been studied by Rao (1967b). Incidentally, the study reveals that a large number of problems reported by the under-achievers reflected problems in the field of motivation.

One of the most imaginative studies done so far in understanding college students' problems is that of Mitra and Khatri (1965). Combining the phenomenological and dynamic points of view, they developed a clinical approach to the problem, both in its manifest and latent aspects, and showed how it could effectively be applied to understand the dynamics of the coping behaviour of students. More studies of this kind are welcome.

Mention may also be made of the NCERT study about problems of urban school pupils and Palsane's study of adjustment problems of university students (Palsane, 1969).

Although University Departments of Psychology have undertaken quite a few studies in the area of adjustment, much still remains to be done. The current uneasiness and restlessness among university students pose a problem for the psychologists and demands their urgent attention.

II. Testing

Tests

Most of the studies in this area deal with construction and standardisation of achievement tests, intelligence tests, aptitude tests and personality inventories. N.C.E.R.T. (1966b) have reviewed all available tests till 1961. Mitra and Dave have reviewed the work in the area of psychological tests and achievement tests in the *Third Indian Year Book of Education* published by NCERT (1968c).

Public Examinations

As early as in 1934, Mahalanobis and Chakravarti made the first scientific study of public examinations. It analysed the marks of the Uttar Pradesh S.L.C. Examination of 1919, and showed the inadequacy of the present practice of grading on the basis of summated raw scores and recommended that ranking should be done using equivalent scores (Mahalanobis and Chakravarti, 1934). Husain (1941)

too has stressed the utility of standardization of examination marks instead of using raw scores. Bose and Chaudhuri (1955) have pointed out that the distributions of raw scores in different subjects are basically dissimilar and suggested a more efficient procedure of finding out equivalent scores using frequency curves.

Mitra (1958) made an attempt, utilizing factor analysis, to experimentally evaluate the validity of conventional method of selecting a candidate on the basis of average marks obtained in different subjects. Extraction of factors common to six periodical and twelve terminal examinations taken by a group of post-graduate students of statistics revealed the existence of at least three ill-defined common factors which could not be relied upon as criteria. He also pointed out that average marks should not be used as the criterion for selection because there was more than one common factor. In another important study, Nanda and Dubey (1958) found the questions of a public examination to be unevenly distributed in respect of difficulty values and showed that the practice of matching items, providing alternatives and the parallel concepts of discrimination and difficulty value did much injustice to the examinees.

In the meantime, one of the most comprehensive project on public examinations under the direction of Drs. P. K. Bose and A. K. Gayen was sponsored by the Ministry of Education, Government of India, in 1956. Extensive and elaborate researches on a random sample of 3,717 sets of answerscripts out of a total of 36,305 such sets in compulsory subjects of the first School Final Examination, West Bengal, were undertaken. Various aspects of the problem including validity, reliability, difficulty values, discriminating power of the questions, distribution of marks, conceptual analysis of question papers and sylabii, etc. were subjected to rigorous scientific analysis that resulted in monumental study-reports (Gayen, *et al.*, 1961, 1962, for example). These reports have borne out unequivocally the lacuna inherent in traditional grading methods and decisively proved the failure of public examinations in the present form even in a gross assessment of the candidates' achievement.

Apparently spurred by these studies, Mallick (1963) suggested some useful modification of the conventional scoring system. Dasgupta (1967) experimentally compared traditional grading method to the equivalent score technique which proved to be superior to the former and stressed the need to abandon the old system.

Some other important problems studied in the area of public examinations are: evolution of examination system in India; composition and activities of Boards of Education; analytical study of instructions given to paper-setters in public examinations [Directorate of Extension Programmes of Secondary Education (DEPSE), 1963a],

moderation procedures in boards' examinations (DEPSE, 1963b); and nature of examiners' judgment in public examination (Mallick, 1963). Taylor and Tenanga (1963) studied the effect of 'Grade Marks'. Harper (1956) studied machine-marking. The technique to develop local norms forms another subject of his study (Harper, 1958a). Studies about the effect of private candidates on the results have been made by DEPSE (1962). DEPSE (1963c) also studied the effect of options in question papers. Harper (1958b) conducted a study on 'Improbable Test Scores'. The Examination Reform and Research Unit of the M. S. University of Baroda inquired into the question of reliability of university examinations. The Unit also looked into the relationship between tutorial marks and scores in the external examinations. Buch and Patel (1961) analysed internal marks and external examination scores at the Sardar Patel University.

Predictive Value of Examinations

Predictive value of public examinations has been studied by Buch (1963) and Dutt (1955). Jog (1963) attempted to predict success at the first year Engineering Examination. The Examination Research and Reform Unit, M. S. University of Baroda has also undertaken similar studies.

Achievement Surveys

Buch, Patel and Kotwal (1960) surveyed pupils' achievement in different school subjects at class VIII, IX and X levels in Gujarat. Kulkarni (1969a, 1969b) prepared a series of sequential tests of attainment in mathematics for primary, middle and secondary stages. Using these tests, a national survey of achievement in mathematics has been completed.

A study by Raina (1965) gives evidence to the effect that much reliance cannot be placed on the internal assessment as a valid predictor of external marks. Mallick (1961, 1968) studied the relationship between internal assessment and public examination scores. The results indicate that text examination scores are poor predictors for one's performance in public examination and that there exists a tendency of over-marking in internal assessment.

Sex differences in achievement have been reported in almost all the studies of achievement surveys. Achievement variations in different socio-cultural settings have also been studied.

The foregoing review makes it clear that the present public examination system has drawn much attention of the researchers in the field. Imaginative and methodologically well planned individual

and collective attempts in the field have already provided us with enormously valuable insights into the problem. But a careful analysis of the nature of other studies carried out so far in the realm of testing in general, and achievement testing in particular, presents a different picture. The studies cover different aspects of the problem, no doubt; but most of them are repetitive or confirmatory in nature and their quality also is doubtful since many of these studies suffer from limited samples and faulty designs. Though a number of diagnostic tests for specific topics have been developed, most of such studies are at the M.Ed. level. NCERT has a major project on the development of diagnostic tests but no reports are yet available.

III. Physical Education

The aspects of physical education programmes studied are: attitude towards physical education and sports; facilities for physical education; physical growth measurement; health education; growth and development of teacher training institutions for physical education; evaluation of physical education programmes; and relationship between physical fitness and academic achievement. Most of the studies are of the survey type and relate mostly to the high school stage. Only one or two studies cover the university and nursery school levels.

Pasupati and Aaron (1968) have established norms of physical efficiency for the 9 year old boys. Shukla (1957) constructed a test of physical fitness. Bapat (1967) has made a psychological study of the methods of measurement and prediction of athletic ability in Kabaddi and Khokho. One of his findings, *inter alia,* is that three different methods, viz., performance scoring method, graphical rating method and overall ability rating method are found to have a reliability coefficient of 0.9 for both Kabaddi and Khokho. He concludes that there is no general athletic ability in Kabaddi and Khokho.

A number of studies are related to N.C.C. training in India. Sharma (1961) studied the programme of N.C.C. training and found that the training has great educational potentiality. In a similar study, Sinha (1968) found a positive relationship between N.C.C. training and leadership qualities. Sinha's study was undertaken on a sample of 300 N.C.C. and non-N.C.C. students. Adiseshiah and Deshmukh (1961) studied candidates for admission to the National Defence Academy and Indian Military Academy. Buch and Hiriyanniah (1968a, 1968b) surveyed the facilities for training teachers of physical education. NCERT has established developmental norms for children of 2-5 to 5 years whereas the College of

Education, Karnatak University, Dharwar has established similar norms for 9 year old boys.

Studies in Physical Education are few and far between. Except one or two researchers, nobody has attempted to fix grade and age norms of physical measurements for Indian boys and girls.

IV. Special Education

Exceptional children mainly fall into four groups: (a) gifted children with a high level of intelligence or a special aptitude for music, painting, art, etc., (b) mentally handicapped or retarded children with a low level of intelligence; (c) physically handicapped children such as blind, deaf, dumb, etc.; and (d) socially handicapped children such as orphans, destitutes, etc.

Not many studies are reported in this area. Some studies try to find out the extent of each group of children in schools. A few studies deal with personality traits, educational interests and adjustment problems of the gifted. NCERT has constructed a battery of tests to identify talent. Mukherjee and Mukherjee (1969) have reviewed significant studies related to educational programmes for the gifted, covering a period of four decades from 1928. Shah (1969) has studied the problems of gifted children in Gujarat.

Facilities for education and guidance, personality traits, recreational interests and methods of teaching the retarded have been studied by a few researchers. Most of these studies are at the M.Ed. level. No study at a higher level has been reported. Mental retardation has been the subject of investigation by clinical psychologists. Kuppuswami (1968) made a survey of mental retardation among children enrolled in middle schools of Mysore city.

Buch and Hiriyanniah (1968a) surveyed the institutions for the education of the handicapped in the country. The study reveals an unsatisfactory state of affairs in most of the institutions. Advani (1965) studied educational and psychological problems of blind children.

Studies on the socially handicapped and deviants are mostly in the personality-clinical field. No significant study of the socially handicapped with definite educational import is available, although much remains to be known about the unique socio-emotional problems in educating them.

Only limited research work has been done and much remains to be done in this area. Handicapped children are to be properly identified and helped by providing suitable facilities for education, guidance, employment and adjustment in life.

V. Educational and Career Guidance

Although the guidance movement in India dates back to 1938 when a section of Applied Psychology was established in the Calcutta University, a planned approach to the development of Educational and Career Guidance began in 1947; but it gained momentum only around 1955-56 after the reorganization of the educational structure at the secondary stage on the basis of the recommendations of the Secondary Education Commission in 1954. Since then, the guidance movement has been periodically reviewed by different workers.

The different aspects of guidance studied are: (a) history; (b) aims and objectives; (c) importance of guidance in education; (d) administration and organization of guidance programmes in schools and colleges; (e) role of teachers, headmasters, administrators and counsellors in guidance programme; (f) tools and technique of guidance; (g) allocation procedures at different stages; and (h) predictive studies of different selection tools.

History

Mehta and Mehta (1960) traced the history of the guidance movement in India. This was followed by another report by Fletcher and Riddle (1962). A study of the organization, administration and functioning of the State Bureaus of Guidance was made by Odgers (1962). Mehta and Kanade (1963) surveyed the guidance practices in schools. Wadia (1966) pointed out the important landmarks and milestones in the growth of guidance movement in India. De (1963) added a new dimension to the concept of guidance by calling it an instrument for national development. In 1969, De surveyed the development of the guidance programmes in India and analysed the major obstacles in its further growth.

Mehta (1957) surveyed the attitudes of the headmasters of schools towards guidance movement and through this study, analysed the perception of headmasters about the concept of guidance.

Aims and Objectives

No special studies are available on aims and objectives of guidance; but some data about them are found in the historical studies. Arora (1956), Gupta (1957), Mohsin (1959) have suggested new programmes at the school level. Harris (1963) detailed out a programme for the Regional Colleges of Education. Job (1964) stressed the importance of guidance at primary stage. Mehdi (1957) highlighted the role of the teacher in guidance.

Tools

A number of tests in the area of intelligence, aptitude and achievement have been developed. NCERT has published the *First Mental Measurement Handbook for India* (1966b). Mitra has reviewed the available tests in *The Third Indian Year Book of Education* (NCERT, 1968c). A number of personality, study habit and adjustment inventories have been constructed.

Dave (1964), Sinha and Sinha (1969), and Tarachand (1966) developed science aptitude tests. Singh (1967) developed an occupational differential whereas Bhushan (1969) developed a scale of leadership preference. A few engineering aptitude tests were also developed (Deb, 1965, 1969; and Vaidya, 1966). Pathak, (1966) studied the self-concept approach to the choice of an occupation. Students selecting teaching, medicine and social work as major fields appeared to possess more or less well-defined self concepts in contrast to those selecting law as their major field. Deb (1968, 1969) could successfully determine the abilities important for academic success in the Science Course.

Chatterjee (1963) studied inventoried interests. Deb (1967) studied the interest pattern of high achievers in natural science. NCERT has taken up a cooperative project to prepare an interest inventory but the results are not yet available.

Study Habits

A number of projects have been undertaken to explore the study habits of school and college students. Chatterjee (1955) undertook sustained studies in this area with teachers under training. His finding is that a variety of factors complicate the main trends observable in the study habits of trainees. Krishnan (1956) reported the construction of a study habit inventory for college students. He has also explored the relationship between the study habits of students and their personality (Krishnan, 1960). Experimentally verifying the internal consistency and validity measures of the Krishnan's questionnaire, Mitra (1959) found that the meaningfulness of the total score of the inventory was doubtful and suggested an alternative scoring key yielding higher predictive validity. Palsane (1963) published his study habit inventory and a manual to use the same. Jamuar (1958, 1969) studied the relationship between study habits, intelligence and achievement. Joshi and Chaudhary (1966), Daftuar (1967), Faroqi and Vyas (1968), Hafeez and Quraishi (1968), Srivastava (1968), Jamuar (1969), Vyas (1967), Joshi (1969), have also investigated the study habits of school and college students. Many interesting patterns of study habits emerge from these studies.

Other Studies

Quite a few studies in the area of educational and vocational aspiration have been reported. Occupational choice of college students was studied by Sinha and Panda (1959). They found that male and female students show considerable differences in their choice of occupations. Muthayya (1967) studied the personal data and the educational choice of high and low achievers in the scholastic field. Bhargava and Singh (1968) inquired into the determinants of educational choice behaviour of adolescents. Bayti (1966) studied the vocational preferences of secondary school leavers in Rajasthan. The study of the educational plans and aspirations of rural boys is reported by Singh and Rao (1966). George and Mathew (1966) reported a study on the vocational aspiration of school leaving pupils. The study carried out on a stratified random sample of over two thousand school leaving students of Trivandrum Educational District showed vocational aspiration to be significantly related to sex, caste, parental income and vocation, urbanization, intelligence and academic achievement. Influence of social background upon the desire of Secondary School pupils to proceed to higher education and characteristics of pupils with consistent and inconsistent vocational choice have also been studied. Mehta (1960b), Sinha and Dash (1959) studied the motivational factor underlying occupational choice. They found that 'social prestige' proved to be the most frequent factor followed by 'money'. Vocational interest patterns of prospective teachers and interest patterns of successful students in different courses of studies are reported by Bharadvaj (1960) and Singh (1965) respectively.

Ahluwalia and Mohan (1969) made a comparative study of reading interests of rural and urban high school teachers whereas Kakkar (1967) made a study of recreational activities of high I.Q. students. Youth, college students, adolescents are the subject of studies by a number of guidance workers. Palsane (1969) studied the problems and perceptions of students. Shanmugam (1965) studied the personality traits of pupils who had their education through the medium of their mother-tongue and English. Mehta (1960b) enquired into the tendency among school pupils to select their vocation and Muthayya (1962) looked into the influence of experimental instruction on the vocational choice of adolescents. Jain (1969) studied the nature of truancy at the pre-university stage.

Dosajh (1965a, 1965b) reports a study on imagination and maturity as factors indicative of success in teaching. Asthana (1945) critically examines the career master scheme in U.P. schools whereas Mehta (1961) has surveyed trainee opinion about the career-master course.

Predictive Studies of Various Selection Tools

Guidance workers have undertaken studies to find out the predictive value of tests and academic achievements. Jog (1963) and Jog and Aga (1966) studied the academic achievement of engineering students and attempted to find out its predictors. Kale (1960) reports a study of the prediction of college students' scholastic success by using early scholastic success and voluntary interest in the subject. He finds both of these as valid predictors of success at the university stage. Rao (1962) reports a study on the prediction of performance of arts and science students. The same author (Rao, 1963a) conducted a study on the prediction of academic achievement of students in an engineering college. Raina (1964), using marks in B.Ed. course as the criteria and marks at the basic degree level as the predictor found that previous academic success was not a valid predictor of success in the teachers' training programme.

The efficiency of Progressive Matrices as a tool for diversification at the higher secondary level was sought to be established by Dosajh (1958). The results indicate that a high score on Progressive Matrices can safely be taken as one of the criteria for selection of students for the groups where a knowledge of mathematics and science plays an important part and in such groups as 'technical' and 'science'.

Guidance movement is in its infancy in India. Impact of the movement with all its implications is yet to be felt by teachers, headmasters and parents. Not much work has been done to improve the efficacy of a large number of training programmes for guidance workers. No studies are available on the theoretical foundations of guidance and counselling, stages of vocational development, vocational adjustment, etc. Adequate tools are not available and much work remains to be done to establish the validity of the existing tools.

VI. Personnel

Personnel include those who are mostly concerned with teaching-learning process, viz., teachers, student-teachers, headmasters, lecturers, educationists, administrators, parents and guardians. Not much work has been done in this area though it is always said that the problem in Indian schools is mainly the problem of professionally motivated teachers.

A glance at the list of Ph.D. theses in Education compiled by the NCERT indicates that, out of 42 Ph.D. theses, only five are in this area. Adaval surveyed the research work in the area of Teacher Education in *The Third Indian Year Book of Education* published by NCERT (1968). Out of 84 research studies (mostly at M.Ed. level),

one comes across only one Ph.D. thesis in the area of Teacher Education.

Research in this area is classified into four categories: (a) teachers and headmasters; (b) teacher trainees; (c) teacher educators; and (d) other categories of educational personnel.

Teachers and Headmasters

Twenty-six studies have been reported about teachers. No study has been reported about headmasters. These twenty-six studies enquire into the professional or the academic problems of teachers, their leisure-time activities, personality, class-room behaviour, attitudes, etc. Shivarudrappa (1968), Maheshwari (1967), Dayal and Chatterjee (1955) and Ahluwalia (1970) studied the academic and professional problems, leisure-time activities, personal background and attitudes of teachers. Sarkar (1968) reports a 'Study of the Secondary School Teachers, Self-Image and Stereotypes towards other Professions'. Srivastava and Rao (1968) studied the personality traits of teachers as rated by pupils.

Pareek and Rao (1970) report a study of teachers' class-room behaviour in Delhi schools. The sample comprised of 50 male and and female teachers. Flanders' interaction analysis technique was used. The analysis of the data reveals that the general pattern in the influence behaviour of the teachers appears to be lecturing, the main 'student talk' category being response to the teacher. Rao (1968) undertook a study of the factors that contribute to the adoption or rejection of educational innovations. He has established certain characteristics of school personnel which promote the adoption of new ideas.

There are quite a few studies in the area of attitudes and values of teachers. Dosajh (1970) reports a study of the change in attitudes of teacher trainees towards pupils. Kakkar (1970) studied the influence of training on trainees' attitudes. His study was undertaken to determine the influence of teacher training upon the attitudes of under-graduate students towards children and it revealed a definite change on the part of the trainees in terms of a more liberal attitude towards children. Kanavalli and Marihal (1969) studied the attitude of teachers towards family planning. The authors found a good relationship between educational level, income and size of the family. The majority of teachers had a favourable attitude towards family planning.

Dosajh (1965a, 1965b) studied the personality traits and attitudes of successful teachers. Shyla (1969), Dosajh (1963) and Ojha (1969) have studied the characteristic traits and attitudes of a successful or

an ideal teacher. Ojha used a check list of fifty characteristics and administered it to 200 male college teachers and 200 male undergraduate college students. The study indicates agreement on at least six characteristics of an ideal teacher between the students and the teachers. Deb (1962) studied the temperamental qualities necessary for success in the teaching profession at the university level and made some useful inferences. Dosajh (1965a) undertook a study to identify the personality traits of successful teachers using Horn-Hellersberg Figure Diagram Test. The study revealed eight personality traits useful for success in the teaching profession.

There are about a dozen studies in the area of teaching effectiveness and teacher competence. Aaron (1966a) studied motivation as a possible correlate of teaching effectiveness. Soundararajan (1969) made a study of some of the correlates of teaching efficiency. One of the findings of the study is that teachers do not follow all the methods and techniques they have learnt and that poor teachers continue to be poor in teaching even after several years of experience. Aaron (1966b) and Joshi (1970) have also undertaken studies in the realm of teaching effectiveness. A major study regarding differences in the identification of teachers and non-teachers was undertaken by Chatterjee (1968). The author used the Bengali version of the "TATSO" Questionnaire. This is a multivariate analysis study. The author has been able to identify eleven variables which discriminate between teachers and non-teachers.

Teacher Training

Of the studies reported, twelve are in the area of teacher training, inservice training, effective training, etc. George and Nair (1965) studied emotional stability and its relation to success in student teaching. Dosajh (1969) studied the relationship between the qualifications of teacher trainees and their B.Ed. marks. One of the findings of the study, *inter-alia,* is that the performance of science graduates is on the whole superior to that of arts graduates.

Palsane (1963) studied the factors related to success in B.Ed. Examination. Reddy (1966) reports a study about the morale of teacher trainees. Marr and Sabharwal (1969) studied the background of teachers and their motivation for teaching. Adaval (1952) has investigated into the quality of teachers under training. Garudacharya (1964) and Upasani (1966) enquired into the education of graduate teachers and primary teachers respectively. Srivastava (1965) studied the impact of in-service programme on teachers. Roy (1965) studied the relationship between the measures of success of teachers as students under training and teachers in schools.

There is only one study about teacher-educators and one more about the professional expectancy among personnel connected with teaching and education (Patil, 1967).

Though the personality characteristics of the personnel occupying key positions in education structure e.g. principals, headmasters etc. still remain largely unknown, there is no denying the fact that most of the studies in this area have devoted much time and energy either to identify the traits essential for successful teaching or to find out teaching aptitude. The shortcomings of such approaches are obvious and a solution of the problem would continue to elude us unless researches stem from a theory of teaching which takes into account the dynamics of the formalized instructional situation (Mitra, 1970).

VII. School Learning and Achievement

School Learning

Reviewing the studies in 'The Psychology of Learning,' Mujib (1968) comes to the conclusion that "there are hardly any studies that may be regarded as serious attempts to understand the learning process or its various ramifications." Some studies in the area of learning are available at M.A. or M.Ed. level. They cover such aspects as the effect of reward and punishment or memory span and its relation to intelligence. A few studies at Ph.D. level have also been reported.

Using the controlled interview technique, Shyamla (1961) qualitatively analysed the processes involved in concept formation and also examined and verified the theories and findings of Jean Piaget with regard to children's concept formation. A case has been made out of the experimental work that training and practice and other environmental factors contributed to differences in thinking in children.

Upadhyay (1965) made a study on the symbolic process involved in learning double alternation mazes by human subjects. After studying a sample of 800 boys of Class VIII, he concluded that "double alternation of problems could not be regarded as an instance of discrimination learning with all its implications". Mishra (1968) studied the significance of cultural background in the learning process. There are other studies in the area of non-cognitive correlates of learning. Shivappa (1968) has worked on "Effect of Task Orientation and Ego-Orientation on Verbal Learning". The study rejects the null hypothesis that task and ego do not differ from each other. Sinha and Lakshmi (1968) studied the learning process

as a function of demand characteristics and dependency. Rai (1968) made an experimental study of concept formation with simultaneous and successive presentation of stimuli. His subjects were 64 non-Telugu speaking male students of Class VII of age groups ranging from 11 to 15. He concludes that (1) simultaneous method of presentation is more facilitating than successive method of presentation in forming concepts; and that (2) concepts are formed on the basis of relational characteristics of stimuli and not merely on their identical absolute characteristics. Two studies, Joshi and Passi (1968) and Singhal (1969), explore the environmental and intellectual correlates of learning.

Retroactive inhibition in learning has been studied by Rao (1966) whereas Kakkar (1969) studied the effect of over-learning on retention. One study by Mukherjee (1966) attempts to find the relationship between need for achievement and learning and the speed of performance.

Academic Achievement

There are a number of studies in the area of academic achievement. These studies examine the relationship between academic achievement and a large number of factors in the cognitive, affective and environmental domains including self-concept, persistence level of aspiration, need for achievement, adjustment, behaviour problems, fear, anxiety, emotion, drive, values, memory, reasoning and interest.

Some studies aim at comparing the level of achievement in one subject to that in other school subjects. High and low achievers are compared on different aspects such as attitude towards teachers, intelligence, vocational preferences and self-concept.

Studies in the area of academic achievement as related to personality and adjustment are reported by Bhatnagar (1966a, 1966b, 1967d, 1968, 1969a, 1969b), Rao (1963b), Rao (1965), George and Abraham (1967), Jamuar (1963), Abraham (1968), George, *et al.* (1967), and Rao (1963). George and Abraham (1967a, 1963b) report a study on 'Order of Birth and Certain Personality Traits, Adjustment and Achievement of Secondary School Pupils'. The study compares the effect of differences between different orders of birth on (a) intelligence, (b) extraversion—introversion, (c) neuroticism, (d) adjustment, (e) academic achievement and (f) achievement in co-curricular activities. The findings indicate that the middle children tend to be more extravert and slightly better in social adjustment than others. A study by George, Pillay, Dharmangadan (1967) investigates 'The Effect of Physical Disability on Personality Adjustment and Achievement of Secondary School Pupils'. One of the findings of this study

was that the physically defective pupils were inferior to their non-defective peers in health, home and school adjustment but they did not differ significantly in social and emotional adjustment or in scholastic achievement. Rao (1963b) studied students' performance in relation to certain aspects of personality and academic adjustment. It was a prognostic study of student performance at the university. The major hypothesis was that achievement would be significantly related to adjustment to academic work. All instruments used in the study, with the exception of the one used to assess mental ability, were specifically constructed and standardized for use in the study. The major findings are that the over-achievers tend to differ significantly from both normal achievers and under-achievers and that the over-achiever has the optimum adjustment to academic situations. One more study in the area of academic achievement (Rao, 1965) deals with problems of adjustment and academic achievement.

Reviewing researches on personality correlates of academic achievement, Bhatnagar (1967e) has observed that such researches gave rise to a state of confusion due to the application of various tools of questionable validity on heterogeneous samples, inadequate control of variables, ill-defined personality traits, use of diverse criteria for identifying under- and over-achievers and weakness in the tests of significance used.

Apart from the study of academic achievement as a function of personality and adjustment, the relationship between academic achievement and self-concept of high school pupils has been studied by Shivappa (1969), effect of emotional tension by Sabberwal (1967), and the relation between achievement and the sense of responsibility by Rao (1964). Raina (1967) studied some of the factors associated with high science achievement. A study reported by Chatterjee and Mukherjee (1969) investigated the effect of proficiency in English on the academic success of pupils at the school level.

Several studies are concerned with the relationship between intellectual factors and academic achievement. These studies include those by Gupta and Kapoor (1969), Rastogi (1968), Bhatnagar (1967a, 1967b, 1967c), Das (1967), and Naidu and Aaron (1969).

Dave and Anand studied the effect of the load of languages on the development of non-verbal intelligence, the acquisition of general information and achievement in subject areas. Srivastava (1966) studied the relationship between vocabulary and academic achievement.

Academic achievement has also been studied in terms of personal problems of adolescent girls (Ahluwalia, 1969), some background factors (Jamuar, 1963), attendance in public libraries (Gurusiddaiya,

et al. 1966), socio-economic status (Bennur, 1966), organizational and administrative factors (Pillai, 1966), smoking habits (Srivastava and Aggarwal, 1969) and sex (George and Abraham, 1967b). Padmanabhan and Vishveswaran (1966) made a comparative study of the achievement in General Science of urban and rural students of Class X. Another study of achievement of pupils regularly promoted and those who failed once or more is reported by George and Abraham (1966).

Sinha (1966) carried out a psychological analysis of some factors associated with success and failure in university education. The study was done on a sample of 185 high achievers and 190 low achievers. Major variables studied were study habits, intelligence, anxiety, health and adjustment in home, and in social, emotional and school areas. Some of the findings, *inter alia*, are: (i) there is a clear-cut distinction between high and low achievers on the anxiety test and the general adjustment inventory; (ii) the intellectual level of low achievers is poor; and (iii) study habits have no relation with high or low achievement. Mehdi's (1967) study undertaken to find out whether there exists a differential pattern of factors for successful performance in science, arts and commerce courses shows that there are no differences between combinations of factors required for success in the respective courses.

Though a large number of studies in the areas of correlates of academic achievement have been undertaken at high school stage, there are only two studies at the college stage in addition to the one by Sinha (1966), viz., those by Fernandes (1967) and Moorthy (1969).

Good and Poor Achievers

Ahluwalia and Narang (1967) studied the personality characteristics of good and poor achievers. The findings reveal, *inter alia*, that psychopathic traits are a hindrance to academic achievement. Factors related to educational under-achievement have been studied by Srivastava (1966a). He also studied different types of criterion variables used for identifying the under-achievers (Srivastava, 1967). The study finds a close relationship between study habits and under-achievement. In yet another study, Srivastava (1969) found that reading ability which correlated significantly with achievement, emerged as a factor related to the phenomenon of under-achievement. Muthayya (1962) studied the case of high and low achievers at related to the level of achievement and intelligence.

Two studies enquire into the incidence and causes of failure. Sohoni (1966) studied the issue of failure at the S.S.C. Examination

of the Maharashtra State and Kothurkar (1961) analysed the failures at the pre-degree examination of the Poona University. NCERT (1961) studied failures in Secondary Schools of Delhi.

Of late there has been an increasing interest in the field of achievement motivation. The studies by Mehta and Muthayya provide a variety of investigations in the area of achievement motivation. Mehta (1968) reports a study undertaken to test the effect on high school boys, of two motivation training programmes, one designed to increase achievement and the other designed to boost aspiration for academic performance. The study indicates that improvement in the academic performance of under-achieving high school boys is possible through motivation training. A major study in the area of achievement motivation by Mehta (1967) has given impetus to undertake further studies to a large number of research workers. (Muthayya, 1967a) studied achievement motivation in relation to autocratic and democratic attitudes. Muthayya and Rajeswari (1968) studied the relationship between personality and achievement motive of normal and backward children. The problem of achievement motivation has been studied with reference to factors like personal aspiration, frustration, personality, etc. Srivastava and Tiwari (1967) studied socio-economic stratification of the need for achievement. Lakshmi (1967) studied the relationship between achievment motive and the rate of learning. Some other studies in this area are by De and Khan (1969), Pareek (1967) and Siddiqqi and Akhtar (1969). Aaron (1968) studied the relationship between n-achievement, n-affiliation, n-power and tasks connected with teaching.

In addition to the above studies, a few major studies are being carried out at Sardar Patel University, Vallabh Vidyanagar, the Centre of Advanced Study in Education, M.S. University of Baroda, and the Education Department of Dibrugarh University.

Despite the availability of valuable leads from the studies already done, lack of well planned attempts is apparent. Solution of this pivotal problem of educational psychology demands more broad-based and comprehensive studies in greater depth.

VIII. Teaching Methods

Research in the area of teaching methods has been classified under three broad headings; (1) methods of teaching; (2) programmed learning; and (3) television and auditory and visual aids.

Pillai has reviewed research in the methods of teaching school subjects in *The Third Indian Year Book of Education* (NCERT,

1968c). Except for the three studies at the Ph.D. level, almost all the studies, about eighty in number, are at the M.A. or M.Ed. level. The first Ph.D. thesis in the area of teaching methods dates back to 1945 when Samant (1945) surveyed the teaching of mathematics in the secondary schools of Bombay Province. Next, Javli (1949) studied the teaching of reading Kannada. After four years, Gupta (1953) investigated into the apathy towards teaching and learning of history in the secondary schools. Chatterji and Singh (1966) established the fact that co-sharing of the same experience by observing and achieving participation in evaluation is effective in establishing a common frame of reference leading to better teaching by teachers and learning by pupils.

Five experimental studies comparing methods of teaching are reported by Hiregange (1968), Patted (1968), Neglur (1968), Raman (1968) and Krishnan (1968). Neglur (1968) studied the effectiveness of two approaches of teaching Kannada. The results indicated that the group which received instruction through the traditional approach showed significant improvement in performance over the other group which received instruction through the new approach. Raman (1968) sought to find out whether the group method of teaching English was superior to the traditional method. Patted (1968) evaluated the effectiveness of two different approaches of teaching geometry. He found that both the approaches were equally effective for the average and superior pupils. Vaze and Kanchi (1968) studied the development of the sense of local history among high school boys and Kanchi replicated Vaze's study with reference to high school girls. Her finding is that there is a gradual growth in the understanding of local history from class VIII to class X. Bennur (1968) made a comparative study of two different approaches of teaching in relation to improving inter-caste attitudes.

Somasundaram and Rao (1966) undertook a critical study of the common errors committed by the students of Std. IX in general mathematics. Srivastava (1968) studied 'recall of verbal material as a function of teaching methods'. Dayal and Saiyadain (1970) reported a study wherein they found that the effectiveness of teams working in organizational or social situations depends upon, *inter-alia,* on the involvement of the members with the group tasks, their acceptance by the group, and the kind of patterns that exist in the groups. A major study in the area of methods of teaching large classes is reported from University College of Education, Dharwar. Marihal (1966) studied the effectiveness of KUCE plan of teaching large classes. His conclusion is that the students are active when they are taught through KUCE plan.

Programmed Learning

The idea of programmed learning is of recent origin in India. During the last four years, the NCERT organized seventeen training courses in programmed learning. The Indian Association of Programmed Learning has been organizing annual conferences. By 1969, a stage was reached when the utility of programmed learning material began to be clearly perceived. Nearly twenty research studies which examined the application of programmed learning in different fields like education, defence, industry, health and agriculture have provided overwhelming evidence in support of its efficacy.

In the context of the present level of inflow of creative teachers, which is obviously low, as also to effect a solution to the urgent problem of improved teaching, Mitra advocated a change in emphasis from teaching as an art to teaching as a science, evaluated the role of programmed learning in developing the science of teaching and proposed a programme for the teachers (Mitra, 1966, 1967, 1968).

Shah (1963) developed auto-instructional programmes in algebra and compared the programmed learning approach with the traditional approach. Her study established superiority of the programmed learning method over the conventional one. Kulkarni (1969) has shown that the new algebra for Class VII or VIII could be taught to the fifth graders. Mullick (1966) sought to investigate the effectiveness of programmed learning technique in a correspondence course situation. Apart from these studies, there are other studies proving the efficacy of programmed learning material over the traditional one (Gupta, 1965; Sharma *et al.*, 1965).

Television and Other Audio-Visual Aids

A perusal of 'A Critical Review of the Studies Available in India in the Field of Audio-Visual Education 1939-63' reveals that there have been ninety-three studies in this area during the period of twenty-four years (NCERT, 1968a). The areas covered by these studies are: (1) efficacy of audio-visual aids in the teaching of school subjects (34 studies); (2) theoretical and historical aspects of audio-visual aids in India (16 studies); (3) films and cinema (13 studies); (4) school broadcasts (9 studies); (5) comparative study of teaching through traditional method with teaching through audio-visual aids (6 studies); and (6) miscellaneous (15 studies). The studies relating to school broadcast do not speak highly of the programme. NCERT has studied the reason for the restricted use of audio-visual aids. Experimental studies establishing the superiority of teaching through audio-visual aids over traditional methods are meagre. Most of the

studies are of survey type, without touching the core problems. Kale (1953) studied "learning and retention of English—Russian vocabulary under different conditions of motion picture presentation". Kale and Grosslight (1955) made exploratory studies in the use of picture and sound for teaching foreign language vocabulary. Dewan and Kulkarni (1967) investigated the effect of two different modes of presenting the learning material, viz. (a) with the knowledge of immediate results and (b) in the question-answer form, employing active responding in the context of televised instruction. The study revealed that the instructional T.V. used for the teaching of Hindi to the Class X of the Delhi secondary schools has been weak, due to the lack of expert presentation, good viewing arrangements and poor participation by class-room teachers. Khanna (1968) reports a study conducted to test the hypothesis that observation through closed circuit television is a more effective method of viewing surgical operations for medical students than the existing method of direct observation. The results support the hypothesis.

Research work in the area of teaching methods has not developed adequately. The studies which have been reported are few. Even though there are more than three hundred and fifty colleges of education in India and almost all the universities offer M.Ed. courses, this field has failed to attract an adequate number of experts to undertake research on vital problems affecting the process of teaching.

Research Needs in Educational Psychology

The present review is neither exhaustive nor intensive. It gives a broad synoptic view of the status of research in Educational Psychology in India. With the paucity of research institutions and still greater paucity of research workers, the present low output of research is not surprising. The situation causes greater concern in view of the fact that, even with the limited number of institutions and research workers, there is duplication and overlapping in research effort at many places. One of the reasons for this state of affairs is that planning and co-ordination of research has neither been taken up by any voluntary organization of professional workers nor by sponsored agencies of the Union Government. Being an applied branch of the Science of Psychology, Educational Psychology does not receive the proper attention from academic psychologists. In colleges of education where Educational Psychology is a compulsory paper, both at the under-graduate and post-graduate levels, attention is paid more to educational problems rather than to problems in the area of Educational Psychology. The little research done in this area in education departments is of poor quality and does not receive

attention and guidance of psychologists from the departments of psychology in the universities. The urgent need, therefore, is to develop a planned and coordinated programme of research in Educational Psychology under the joint auspices of the departments of education and psychology in the universities.

The present review indicates a number of gaps in the research efforts in the area of Educational Psychology. In fact, each of the sub-areas requires augmented efforts if the level of research is to be brought up. The problem is no doubt linked up with the overall development of research, both in Education and in Psychology in the Indian universities. The rapid urbanization process, the accelerated rate of industrialization and expansion of educational institutions have brought many new problems in their trail. One of the major problems is the adjustment of the youth to new conditions of living and to new ways of life. Problems arising out of this state of affairs for the school going and the university youth require closer attention. For research workers, the problem of the home and institutional adjustment of youth provides an important area of research. This problem is obviously connected with the present climate of tension and uneasiness in the university campuses all over the country. This is one area of priority for research workers.

In the area of testing, the need is to develop such tools of measurement of academic achievement as would help to draw a comparative picture of the attainments of pupils in the different parts of the country. NCERT has already made a beginning by developing sequential tests of attainments in mathematics in different languages. For the first time, a tool has been made available to make a comparative study of achievements in mathematics between different parts of the country. The need is to continue efforts in this direction and develop similar tests for other subjects. This is the second area of priority where research efforts will have to be concentrated.

In the area of learning and achievement, the necessity is to critically examine what is going on in the class-room. Some of the institutions have already initiated projects in achievement motivation. The Centre of Advanced Study in Education, M.S. University of Baroda is concentrating its efforts on the interaction process analysis and the class-room climate. What is needed is a major collaborative study in the area of dynamics of teaching-learning process in the class-room. The Baroda Centre has already initiated a 'Co-operative Project on Productive Teaching (COPPT)'. There are more than fifteen institutions participating in the project. A few other institutions are working on achievement motivation. It is necessary to support these individual efforts and develop a major co-operative project in the area of dynamics of teaching-learning in the class-room.

In short, the three areas that should receive priority for research support are: (1) problems of youth adjustment; (2) developing sequential tests of attainments on a national scale; and (3) undertaking studies on the dynamics of teaching-learning process. If the present review could help the prospective researchers to identify further gaps and provide leads for further research, the purpose of the present study would be more than fulfilled.

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4

Experimental Psychology

A Trend Report

By

V. K. Kothurkar

Introduction

THE PRINCIPAL object of this survey is to review broadly the work done in India in the field of Experimental Psychology, to identify major research gaps and to indicate the important areas in which research will have to be promoted in the years ahead. It is hoped that this survey will enable the interested student to see the current problems of experimental psychology in India in their proper historical perspective and to learn about the enthusiasms, activities, limitations, and frustrations which are concomitant upon the growth and development of this young science in India.

The research papers covered in the survey report fall broadly under the following categories:

I. Psychophysics;
II. Sensory Processes;
III. Perception-Attention;
IV. Reaction Time;
V. Work-Fatigue;
VI. Physiology of Behaviour including Animal Behaviour;
VII. Learning-Memory;
VIII. Thinking and Problem-Solving; and
IX. Psycholinguistics.

I. PSYCHOPHYSICS

Theoretical writings of early workers like Mitra, Banerji, Samanta and others elucidated Wundt's methods and problems pertaining to experimental psychology. Apart from familiarizing with the

issues of new psychology, such theoretical writings are of interest even today as they give a sense of historical continuity. They were also attempts at learning the use of different psychophysical methods in understanding human judgments about magnitudes etc. They were however replicative and corroborative rather than creative or inventive.

Indian psychologists like Mitra, trained in early German laboratories, were found working with excitement and enthusiasm on what he called 'Fechner's paradox' (Mitra 1925). Maiti (1927) innovated a novel method of photometry to simplify the customary procedure of brightness discrimination and to make it more practicable. Pal (1936) followed the lead and verified the old results regarding the effect of different sensory and muscular attitudes on discrimination judgment when the stimulus strength increased continuously. He continued this experimentation and presented his own results on adaptation with slow rate of change (1944). He (1942) also claimed to have discovered a law of higher generality than Weber's in respect of differential threshold for lifted weights.

These early attempts were not followed up. Recently, however, Chatterjea and Kundu (1960) constructed psychological scales for weight and Chatterjea, Datta and Mazumdar (1964), for visual length. Mallick constructed scales of thickness (1962), of angles (1964), and also verified Thurstone's law of discriminal process (1968). Discrimination ability was studied with certain other variables also. Deb (1968) showed the effects of directional changes on discrimination ability of severe retardates.

Other psychologists have used psychophysical methods in their experiments on sensation and perception; but 'their attempts with psychophysical methods had been just to learn the application'.

Indian psychologists thus proved their competence very early but lost the initiative. It is only in this decade that they have again shown their capacity in this field. The recent experiments are mostly on scaling methods; but a vast area still remains unexplored, both within scaling and outside. With more sophisticated techniques and with the development of intradisciplinary and interdisciplinary methods it should be possible to extend our contribution to the different fields of experimental psychophysics. Tayal's significant work on perception may prove to be a pointer to the new awakening (1964, 1965).

II. Sensory Processes

Sensations have received comparatively less attention from Indian psychologists. Research work on vision covers brightness discrimi-

nation, colour vision, binocular vision, light and dark adaptation, and visual autokinesis. There are very few publications on audition, pitch and cutaneous sensitivity-touch. There is hardly any work done on the chemical senses—gustatory and olfactory.

Vision-Brightness

An early experiment in vision was done by Banerji (1932b) on the intensity of objective brightness. He was probably drawing attention to what is now called summation. With the technological limitations of the early Indian psychologists and undeveloped conditions of psychology laboratories, very accurate quantitative results were not expected. What is admirable, however, is that, with simple devices, they dared to make controlled observations. Against this background, Mitra and Datta (1945) conducted experiments on quantitative mental estimate of brightness values which confirmed the previous finding—discrepancy between the presented and estimated shades of colours—black and white.

Colour Vision

In 1928, Pal gave a good empirical case study of the nature of colour experience of a partial colour-blind subject. A very good experiment on colour vision comes from Sirkar (1962). He studied quantitative mental estimation of various colours. The results showed confirmations of, and also deviations from previous findings; but there was no attempt at any kind of theoretical formulation. Reference may also be made to Tayal's (1967) work on colour vision. He offers an ingenious model to conceptualise the chromatic field in terms of coplanar vectors, to which the laws of physics as applicable to physical forces could be extended.

Binocular Vision

Banerjee (1944) tested the phenomena of binocular rivalry. He attempted to determine time relation, psychical and experimental conditions of the reported movement of stimulus figure. When two different figures were seen through stereoscope, he explained binocular equilibrium as a result of muscular adjustment which was not possible immediately after the first contact with object and might be lost after a long duration due to fatigue.

Light and Dark Adaptation

Zachariah (1967) studied adaptation in order to test the Hecht-

Wald photochemical theory. Results supported Wald's three state theory.

Visual Autokinesis

Gupta and Jawa (1968) found that the difference of amplitude of compensatory movements in the sets of experimental conditions was statistically insignificant—a finding which is an evidence of the invariance in the phenomenon. Males were characterized by a greater spread of the amplitude, shorter latency period, and longer overall movement duration and the amplitude of the directions was arranged in an ascending order of the magnitude—down right, left, and up.

Audition

A study on the disparity of binaural acuity by Banerjee (1931) was the first in the field. Then Cama (1944) attempted to study the determinants of pitch in the human voice and their influence on personality type.

Cutaneous Sensations

Roy (1936) presented an experimental study of certain qualities of the sense of touch. Instability of spots was found. Strangely, he wrote about the homogeneity of cutaneous sensation and denied differential sensibility in touch. Mukherji (1936) proposed a new theory of thermal sense in an attempt to reconcile 'paradoxical cold' and 'psychological zero'.

Other Variables

Chauhan and Tiwari (1969a) experimented on psychophysiological sensitivity as a function of sex. Another experiment by Chauhan and Tiwari (1969b) is on psychophysiological sensitivity as a function of intelligence. More research is needed on this topic. Further, one certainly feels the deficiency of original research in the psychology of sensory processes.

One should encourage those who have the necessary competence to undertake research on special senses to work in co-operation with the physiology departments of medical colleges. Simulated high altitude research can sustain any amount of work on sensations. The behavioural effects of recent psychedelic and psychotropic drugs have scope for a variety of investigations and research

in our country. Indigenous medicinal plants, herbs and drugs may also be tried. We would also suggest that the services of a qualified technician, with at least a diploma in electrical engineering, should be made available to departments where work of this nature is going on.

III. Perception-Attention

Attention

Considering its theoretical and practical importance, it is surprising that *attention* has attracted so little work from Indian psychologists—there is a considerable dearth of systematic experimental studies.

The first experimental study using tachistoscope is by Sarkar (1942) on mental factors in attention errors. It distinguishes between good and bad observers under experimental conditions. Dosajh (1950), using a simple fall-tachistoscope showed that the span of apprehension has a significant correlation with intelligence. Sinha and Sharma (1961) experimentally found that extraverts and neurotics have a larger fluctuation in attention. Mohan and Mohan (1968) report studies on fluctuation of attention. Research here is at least twenty years behind the present stand on the subject. Signal detection and information processing, which are at present regarded as germane to the studies on perception-attention, have not yet been reported in Indian research journals.

Distraction

Adiseshiah, Rao and Dass (1961) investigated the effects of distracting noises on visual efficiency and found that the stress of noise has more marked effect on concentration than on the serviceability of memory. A group of experiments have been reported on the effect of meaningful distraction on differential performance in relation to age, sex and intelligence by Sen and Sen (1968) and Agarwal and Shrivastava (1969). Pande and Kothari (1968) report that field independent subjects were superior in cancellation task. They propose the use of cancellation task as a test of field dependence. Ramamurthi and Parameswaran (1964), Ramamurthi (1967) and Ramamurthi and Krishnan (1967) conducted a series of experiments on perceptual figural reversals in relation to age variables and personality factors.

Paul (1964a) and Venkatramaiah (1964a) respectively studied figural after-effects and perceptual illusions. Pande (1966) found that fami-

liarity with constancy phenomenon affects the magnitude of size constancy. Kale (1966) pointed out some new illusion types.

Figural-form: Perception

Bose and Kanji (1926) studied perception of form by passive touch and brought out the role of inter-sensory complication. Mitra (1927) formulated some experimental problems on indirect perception of form and explored them with simple instruments like Campimeter. In a study of figural perception by Ganguli and Samanta (1928), psycho-physical methods were used in the investigation of closure principle and certain detailed relationships were worked out. Kaur (1967) proposes that geometrical figures can be classified into two groups of hierarchical facilitating quantum for the perception of movement and that a definite shape of figures favour movement perception. Chakrabarti (1968) investigated the influence of difference in sensitivity on tactual perception of form among deaf and normal children and found that deaf girls were superior in their perception. Outline figures were more clearly perceived than solid figures. Elaboration of the theoretical implications of such findings is needed.

Perception of Depth, Distance, Area

Sengupta and Bose (1927) report an experimental investigation of the typical Wundtian problem of monocular perception of distance. Though the results are largely corroborative, they are useful in establishing relationships with Wundt, Titchener and others for discerning students who have a feeling for the history of the subject. Banerjee (1928) experimented with blindfold description of distance and found that errors were larger for longer distances and that practice improved distance estimates. Samanta (1932a) established the rigour of psychophysical methods on visual perception of areas. This virtue is often lacking in some of the work of modern Indian psychologists. Bose and Bose (1933) uncovered a new anaesthetic phenomenon. Under certain conditions, if two gradient stimuli are presented, then the stimulus of the smaller magnitude is not perceived even though it is above the threshold value. Chatterjea reports two studies (1952, 1954) on perception of apparent movement (delta movement). Factors like the distance between the two figures, attitude and eye movements of the individual and camera speed play an important role in apparent movement perception in motion pictures. The expertise shown in managing the instrumentation side of such projects needs the establishment of an active

centre of continuing work where research is pursued in its essential cumulation and connectivity. Another study was reported by Bagh (1954) on the 'after-lag movement' defined as that movement which comes after original movement when one of the stimuli is withdrawn in Phi-phenomenon. Such perception of after-lag-movement has been found to be related to suggestibility. Also some differences, though not significant, have been found between psychology and non-psychology students. Sirkar (1963) reported a study on depth perception investigating the practice effect and effect of rod width on distance discrimination. It was observed that practice and larger sizes of standard rod improve the judgement. Chakrabarty (1964) conducted an experimental investigation into error in reproduction of tactually perceived distances greater than the two-point RL values. The under-estimation by subjects increased with larger distances.

Tayal (1964a) questions the theoretical basis of Fechner's law, and proposes that 'the magnitudes of sensation do not increase in one to one correspondence with increasing intensities of stimuli: whereas one varies in one geometric ratio, the other varies in a different geometric ratio'. He has shown that this model is in agreement with the power law relation in psychophysics. He has also extended this principle to the size constancy data in replacement of Holway and Boring's formulations.

Further Tayal (1965b) offers broad unifying models, through which a number of related visual phenomena find an explanation under a single set of principles. At the psychophysical level, he conceptualises that 'the intervening neural activity may be conceived to involve two opposite processes going on simultaneously: one, a positive process leading to an increment; the other, a negative process leading to a decrement. Further, the increment in neural activity per unit of time is proportional to X^n where X is the intensity of the stimulus and n is an appropriate constant; and the decrement per unit of time is proportional to the level of neural intensity at the time'. The significance of this model is that discrete and unrelated formulations such as the Bunsen-Roscoe law and the Graham and Margaria's principle for absolute thresholds, the power law for difference limen, and the Talbot-Plateau law for the intensities of the fused field have been unified under a single scheme. In addition, Bartley's work on critical flicker-fusion phenomena also falls within its scope.

Tayal (1970b) has also put forward another theory for complex visual phenomena. He argues that a set of information inputs, exclusively from the retinal image sources, cannot furnish the complete information necessary to generate outcomes in correspond-

ence with phenomenal experience. To offset this lack of information, a supplementary set of inputs is necessary. He seeks the source of this supplementary input in the constant fluttering motion of the eye called the nystagmus. The two sets of inputs, one, from the retinal image sources, and the other from the parallax or the retinal shift in the image, induced through pupillary oscillaction, generate a 'processed-image' in the phenomenal space. This processed-image is the progressed version of the retinal image and a processed version of the external reality in a three dimensional perspective. Quantitative relations characterizing the processed-image, applicable equally to the central and the peripheral vision have been advanced by him. The significance of this theory again lies in presenting a unified principle for a wide variety of visual phenomena. He has shown that his theory is capable of explaining three dimensional perspectives of form perception, both toward and away from objective reality in different orientation of a plane relatively to the line of vision. His formulations also conform with the views of the physiologists like Gordon and Chapanis, that poor form acuity in peripheral vision is to be partially ascribed to the spatial location of the receptor cells, rather than wholly to their anatomical character.

Time Perception

A theoretical paper on time perception by Pars Ram (1944) depicts some terms of Indian Psychology—Patanjali Yoga Sutra. The author points out means of reaching objectivity and fidelity (veridicality) in perception. An alternative approach would be to make a more systematic attempt to cast experimentally the detailed hypotheses derived from Yoga Sutra or other systems of Indian Psychology. Experiments by Chatterjea and Saha (1962) and Sinha and Prasad (1964) are on time estimation, testing the influence of such variables as time gap between presentation and estimation, filling the interval with the most or least preferred colours, etc. Namdeo (1967) examines the influence of personality variables and some related factors in the judgment of time. He found a general tendency to underestimate, which was more pronounced in introverts than in extraverts.

A study on time estimation by Meade and Singh (1967) tried to determine the effect of motivation and achievement on psychological time in rural and urban subjects and found that fast workers and high motivation subjects estimated the time to be shorter than slow and low motivation subjects. Cultural variable did not yield any significant difference. Gupta and Prasad (1967) report a study

of the effect of increasing intensity of shock on the estimation of visual and auditory temporal durations. They found that visual and auditory presentation of the duration makes a difference in its estimation. Conditions before and after administering the electric shock are significant factors in these estimations. Under normal control conditions, visual presentation is underestimated while auditory presentation is overestimated. The apprehended stress makes a subject underestimate. Even under stress of an impending threat of increasing intensity of shock, the auditory presentation is overestimated but with a decreasing rate and tends to reach the standard value of stimulus duration as the stress is further increased. Some of these findings on time estimation may be of interest to workers in the field of human engineering.

Aesthetic perception

Mitra and Ghose (1936), in their experimental studies in aesthetic perception, found highest preference for figures consisting of curves resembling parts of human body. Shastry (1939) experimented with Seashore's tuning forks in an attempt to determine the aesthetic value of musical notes. His further work (1941, 1942) is of stimulating value in this field and in a sense, a pioneering type of work. Raychaudhari (1963) has attempted to investigate some perceptual characteristics of incipient artists and verified the previous findings that individuals, artistically gifted, show tolerance of ambiguity and preference for complexity.

Perception of Colour

Sharma (1962) observed individual preferences for two colour and three colour designs and found that the former were preferred to the latter. It is to be hoped that this does not remain merely an idle experimental finding but that industries take it up for useful practical application and support such research in turn.

Functional Psychology of Perception

Sinha (1952) has reported an experimental study of a social factor (group norm) in the perception of apparent movement time. Conformity was greater when the standard was near the individual median. Inability to conform made subjects uneasy. Chatterjea (1954) examined the perceptual side of regression experiments on perceptual defence. Sinha and Sinha (1957) experimentally proved a basic tendency in man to overestimate certain desirable qualities in liked and valued objects including personal ones.

Malhotra (1958) investigated figural after-effects and challenged Kohler's classical theory of having a cortical basis for them. Malhotra tried to demonstrate a noncortical factor in such figural after-effects.

Asthana (1960) and Jaini and Asthana (1963) report two interesting experiments on perceptual distortions using aniseikonic lenses. Results bear out the conclusion that perceptual distortion is a function of the valence which an object acquires from the field structure in which it exists. It is further suggested that Gestalt and learning theories of perception could be reconciled through the Lawinian model employed here.

Roy (1964) and Gnanambal (1967) carried out two studies separately after the pattern of Bruner-Goodman work on judging sizes of coins to verify the influence of need-motivation factors. This should prove a fruitful line of experimentation, provided the rigour of exploring the structural variables of perception is observed in such functional work.

The effect of manifest anxiety on perceptual function has been investigated by Uma and Reddy (1965), Gupta and Adya (1967) and Gupta and Prasad (1967). They observed that anxious subjects show less perceptual stability.

Rabindradas (1969) explored perceptual stability among the rigid and non-rigid and found that the highly rigid group is perceptually less variable.

Mohsin (1941) and Borude (1965) expounded the notion of mental set and demonstrated its facilitative effect on learning different types of work lists (part—whole—genus—species, etc.).

Chakrabarty (1962) brought out the role of set on two-point tactual threshold perception.

It is necessary to emulate the experimental rigour of both the formalists and the functionalists for better progress in this field.

Some of these perception experiments are on a grossly empirical level without any theoretical import. A grasp of different theoretical pursuasions will enable one to confidently plan more incisive experiments. Basic assumptions of 'New Look' theorists provide a vast scope for the experimentalist.

Transactionalist research does not appear to have stimulated Indian psychologists on any significant scale except perhaps at Ahmedabad. Some good Ph.D. studies reacting to the methodological and theoretical ideas of Murphy and Solley and Witkin have been carried out at Poona and Delhi respectively. The inner control which the yoga practitioners claim should be verified by means of Witkin-type field-dependence-independence tests. The Gestalt, cognitive learning, information processing and integrative theories of perception

provide fertile sources of hypotheses in what is emerging as the one most important unifying process in psychology. On this issue, Das (1968) studied the satiation effect in auditory vigilance.

Orienting responses of retarded and normal children matched on age were studied by Das, Dyer and Bower (1969) in an attempt to locate a basic attentional deficit in the retardates.

Concurrent approach of information processing to the structure of human perception-attention needs to be followed more vigorously by Indian psychologists. 'Perception is a multi-stage, multi-process set of operations rather than something which occurs immediately, instantaneously and invisibly.' There is scope for some fine grain analysis of these sub-processes, stage by stage. Cherry's selective attention, Broadbent's filter theory, signal detection theories and computer simulation should be intensively studied.

Sometimes perception is considered from what is called the standpoint of Indian Psychology as depicted by Aranya (1938), Banerjee (1937), Bose (1930), Narain (1938), Raju (1942) and Sinha (1934). In actual practice such analyses fall in the domain of speculative philosophy or epistomology. For the psychologist, a more fertile approach would be to make a systematic attempt to test experimentally detailed hypotheses derived from, say, Yoga Sutra or some other system of Indian Psychology (Mitra and Mukhopadhyaya, 1958).

In any research, a conceptual theoretical frame of reference is helpful in planning more incisive experiments. The Gestalt, cognitive learning, information processing and integrative theories of perception provide a fertile ground of hypotheses in what is emerging as one of the most important unifying process in psychology. The basic assumptions of "New Look" theorists also provide vast scope for the experimentalist which has not been yet fully exploited. The functionalist tradition of experimentation into motivational dynamics of perception has hopefully stimulated some of us. But it is well to be warned of 'sloppy' experimentation and to remind ourselves that we must insist on the rigour of the so-called formalists in examining the need variables, etc.

IV. Reaction Time

Research work on reaction-time in our country dates back to 1920 or so. The work done covers many aspects of the phenomenon, viz., norms, stimulus-variables, response and other variables and mechanics of instruments used.

Ganguli and Samanta (1926) reported, probably for the first time in India, norms for natural reaction-times to visual stimuli in case of Bengali students. Nothing new was tried except perhaps a fresh

sample of population. Banerji and Ghosh (1935) examined the utility of Vernier Chronoscope to measure RT for perceived movement. It was only after 1965 that further work was done in the establishment of norms.

Purohit (1966b) studied the relationship between the inhibitory-facilitatory affects of RT due to a sudden increase in stimulus intensity and some personality characteristics like introversion, anxiety, neuroticism and autonomic liability. A significant negative 'r' between RT to a weak stimulus and the inhibition-facilitation effect was found. However, nothing definitive has come out in so far as the relationship between RT and personality factors is concerned. Similar experiments were performed later (1966c) by him with some change in the kind of response to be given. Personality factors in relation to RT need to be experimented more sensitively, more crucially.

Prakash and Nayak (1956) found that frequency of signal tone and noise level influence reaction time. Mathur (1967, 1968) compared (a) bisensory discrimination reaction times with (b) simple RT for similar stimuli and also with (c) unisensory discrimination RTs for the same stimuli. Results were quite along the lines expected, with 'a' greater than 'b' as well as 'c'. The other finding was that the number of stimuli presented in the same sense modality did not show any marked difference in case of unisensory and simple RTs. This can be further explored, trying out various other sense modalities. The same author (1964) earlier studied sex differences in RT with age as the variable factor. This is a good replication of the simple experiment with results as expected, viz., latency decreases with increased age and the boys show a quicker improvement than the girls. Females were found to be slower in nearly all types of RT by Tandon (1967). This is quite as it should be.

In an experiment, Kool and Pestonjee (1968) have confirmed their hypothesis that authoritarians give a quicker reaction than the non-authoritarians, when the polarity of set is charged. Probably authoritarians are better motivated and more involved in things they have to do.

Jalota (1932) discovered a serious fault with the Hipp chronoscope readings caused by the gravitational force.

On the whole, the work done in Reaction Time is scattered. Although one does find some orginality in case of one or two studies, there is a general lack of follow-up and related work.

V. Work and Fatigue

Basu (1953) presented a study of voluntary movements recorded

by dynamometer as modified by pleasant and unpleasant stimuli among the Nolvas of Bengal. This work is similar to Brono's study with a different sample. Rath (1959a, 1959b) investigated certain aspects of work-curves and attempted to work out measures of similarity in them. Roy and Sinha (1966) report a study of anxiety level and the effect of practice on mental work with the finding that high and middle level anxiety groups gain significantly from practice. Hundal (1969) examined knowledge of performance as an incentive in repetitive industrial work and found that output was directly related to the degree of information. Patel (1969) showed warm-up effects in post-rest motor performance as a function of effort, distribution of pre-rest practice and sex difference.

Venkatramaiah (1964b) explored the effect of anxiety on variability in mental-motor co-ordination of mental patients and observed that anxiety influences the performance of any task involving mental or motor co-ordination and that greater the anxiety, the more varied the influence. Murty and Reddy (1967) tried to study psychomotor learning in relation to manifest anxiety and noted that the various anxiety groups differed significantly in terms of mean error but not with respect to time scores. Mohan and Menon (1968) studied physical persistence and its association with mental retardation and found slight, not statistically significant, superiority of retardates. The former author also studied the effect of rest (1967) on performance.

Kanjilal (1944) observed the emergence of natural muscular rhythm (in bulb-pressing) which subjects find pleasing. Kundu and Chakrabarty (1963) report a study of relationship between speed and score in mental work. Jawanda and Kakkar (1968) have investigated the problem of noise and work.

Sinha and Ghosh (1928) first introduced the experimental model of work on fatigue and its consequent conditions. Banerji and Banerji (1935) experimented and wrote about the possibility of using RT as an index of fatigue and further found that the chronoscope was superior to the dynamometer in this respect. Mukhopadhyay and Sirkar (1957) found that the sensation of work-strain upto the fatiguing condition bears resemblance to some attributes of pain and pressure which affect the organism both psychologically and physiologically.

VI. Physiology of Behaviour

Here the psychologists are required to do balancing acts, not on a tight rope, but on a slack rope. The balancing act requires that they retain an anchorage in psychology and, at the same time, try

to gain the requisite background in physiological and comparative aspects.

Gopalswami (1925) did pioneering work on PGR and suggested that it may be due, not to emotive factors, but to intellectual rational processes. Shastry (1930) used PGR to determine the affectivity of verbal and pictorial presentation of meaning. Samanta (1934) tried to induce emotional states in laboratory and studied them with the help of pnuemographic instruments. Rao (1946) reports his study on PGR and its application to crime detection. He used the method of irrelevant and relevant words and found that innocents give low reactions for guilt related words and concludes that PGR technique is better suited for elimination of innocents. Anand and Dua (1955) experimented with stimulation of limbic system of the brain in waking states. Das Gupta (1956) investigated the effect of frontal section through the hypothalamus on respiration, of diencephalic cats. Rao, Gundu, Krishnaswamy, Narasinhaiya, Haching and Govindaswamy (1958) have reported a group of experiments on a Yogi in a controlled state. Patel, Grant and Hunter (1958) studied spontaneous recovery of the conditioned responses.

Singh and Eysenck (1960) conditioned an emotional response in rats. Das and Bhattacharya (1964) report on an experimental study of the effect of simulated underwater condition on psychophysical performance. Results showed no significant deterioration.

A series of experiments on the behavioural effects of drugs and hormones has been reported by Singh and co-workers (1965), Dandiya and Menon (1965), Bindra and Holmut (1966), Surya, Ansari and Rao (1965), and Mukerji and Shah (1966).

Purohit (1966a) examined personality variables, sex-difference, G.S.R. responsiveness and G.S.R. conditioning. Singh (1967) wrote a note embodying experimental results regarding spontaneous instrumental responding as a function of different levels of drive and effort. Jain (1967) studied personality and drug effects on illusory changes in speech upon repetition. VTE was observed more in introverts and neurotics as also under drugs.

VII. Learning and Memory

In India, learning-memory have perhaps received maximum attention from research workers, although one cannot claim to have attained the western standards of excellence. Topics range over motor learning, serial learning, paired-associate learning, transfer and retroactive inhibition, recall, recognition, reminiscence, verbal conditioning, probability learning, animal learning, motivation, and short term memory. Experimental variables tested include: age,

school grades, sex, sex personality factors like anxiety, neuroticism, extroversion-introversion, egocentrism, task orientation, task versus like difficulty level, and some drugs.

Cogshall (1929) used the mirror drawing test to compare 'whole' and 'part' methods of learning by trial-and-error. Conditioning was being debated and Bloom (1927) proposed that the influence of cortex on conditioning is greater than that of the spinal cord. Bagley (1930) drew attention to the capabilities of EEG in the explorations of brain functions in learning and other mental processes. Kale (1932) experimented with learning and the retention of English and Russian words with different conditions of motion picture presentation. Ebbinghaus' methods and materials were introduced quite early by Watt (1929) who studied individual differences in the memorization of nonsense syllables.

Serial Learning

Under serial learning a few studies have been reported, independently, on the Von Restorff isolation effect by Lothacker (1934a, 1935b) and Von, Clarke and Cooper (1968). Extending the Restorff results to delayed recalls of varying intervals, Lothacker (1936) found that the recall superiority of an isolated number decreases as retention interval increases. Further, the original isolation effect was extended to meaningful background materials thereby, in a sense, corroborating the Ebbinghaus and Restorffian traditions. In this connection, it was reported that the recall superiority of an isolated item is less when embedded in meaningful materials. In the delayed recall after four months, the removed was found to have its foremost position. It was felt that these experimental studies have broad implications for the interference theory: the dissimilar is discriminated and better retained owing to freedom from confusion and interference; but meaningful associations and familiarity also facilitate discrimination and downcreasting of the response learning plane in addition. Patel and Shastri (1962) studied efficiency in serial rote learning as a function of visual as against the oral mode of presentation and found intelligence and the mode of presentation to be significant factors.

Remote associations indicating zero transfer effect in the learning of a derived list were studied by Barnabe and Deshpande (1967).

Different kinds of learning are operating upon the initial, middle and final items of a serial learning task were proposed by Lothacker (1935b) as a partial explanation of the typical bow shape of the error function. These sets of unintellectual factors are ancillary to interference factors.

Plaskov (1966) plotted the learning curves by Jensen's method of the index of relative difficulty and found that this does not affect the important characteristic of serial verbal learning even when the interval interval is increased. Bartels (1968b) found that overall shapes of serial position curves were unaltered by the forward lists of different order, thus supporting Jensen.

Paired-Associate Learning

An experimental investigation of the problem of paired-associate learning is of very recent development in our country. A study by Ray (1967) on continuous and paired-associate learning aimed to explore the nature of the interference that develops due to response competition and the differential effect that the one period has upon the process recall and learning of the first and second list responses. The study presents an experimental analysis of the critical phenomenon of interference. Meaningfulness has assumed critical importance and has been shown to perhaps the most important single variable in the explanation of human learning. Kothekar (1963) assumed that the difficulty-meaning relationships could not be entirely independent of interference from previously formed stimulus response habits and proposed that the difficulty of one in paired-associate learning may be regarded as being a joint function of 'transfer gradients' from previous stimulus response relationships and the inherent meaningfulness of stimulus and response terms. The High-High, Low-High, High-Low, Low-Low hierarchy of effects obtained for learning was not found in the case of retention. This is because in learning 1931, some interference or negative transfer from old multiple associations of the meaningful stimuli is to be expected. However, as learning proceeds, the experimental responses alone are reinforced and the erroneous associations, not being reinforced, are extinguished and inhibited. The extinction or inhibition of old S-R habits generated in the learning of 1931 is displayed during the interval between learning and recall as no learning runs. The extinction process which blocks and neutralizes habit strength of old associations, weakens by passage of time, thus allowing old connections to interfere with the recall of experimental response units. There is some spontaneous recovery of old connections which now interfere and reduce the recall score of 1931 as compared with 1.31. In learning 1931, old habits are held in abeyance and the present drive favours the production of reinforced responses. However, in remembering the individual is thrown back upon his past, learned reactions and associations; there is competition and rivalry among them which causes errors into

ference and reduced recall. In LH, the low meaningful stimulus has fewer or no associations connected with it and hence there is less interference and better recall. By the time of the retention test, the old inhibited bonds spontaneously recover and, because of the relative freedom from the bounds of the present, cause greater interference in the recall of HH.

Kothurkar proposes that paired-associate learning could be fruitfully integrated in the conditioning model which is capable of generating many testable hypotheses. He also proposes that the meaningfulness of terms is an important variable determining the ease or difficulty of paired-associate learning. The more meaningfully related S-R pairs are, the better are they learned and remembered. This favours an integrating and unifying role of relations. Things do not get linked up mechanically through sheer frequency of juxtaposition, but in human learning they are organized into meaningful patterns of relatedness. A series of experimental studies was separately conducted by Hazari and Prasad (1964), Purohit (1965) and Sinha (1967) on 'Paired-associate Learning as a Function of First Letter Similarity', 'Satiation Treatment and Learning of Competitional and Non-competitional Pairs of a Paired-associate Task', 'Levels of Introversion and Competitional Paired-associate Learning' and 'Effects of Praise and Reproof on Paired Associate Learning in Educationally Retarded Children' respectively. Roy and Singh (1968) found that PA learning and retention was most efficient with geometrical figures and then, in order, came words and nonsense syllables. The neat and well-planned experiments mentioned above indicate that, in this kind of experimentation, a level of sophistication has been attained on the basis of which and through the available literature, more purposeful research can be pursued.

Transfer

Attempts were made earlier by Indian psychologists (Jalota, 1934) to analyse transfer phenomena in simple mirror tracing. Sinha and Ghosh (1960) studied transfer as a function of identity between the responses of training and transfer tasks and found that transfer facilitation is proportional to the extent of identity between training and transfer task responses to the same stimuli. Ramamurti and Parameswaran (1963) again studied bilateral transfer on a mirror drawing task using young and old subjects. Sen and Sen (1969) investigated associative transfer as a function of prior learning in a PA task among mental defectives and found marked facilitation in learning the second list when the prior list had been learned to

a higher degree. Upadhyay and Sinha (1968) studied transfer in learning double alteration mazes by humans. In this field, work by Sinha and Sinha (1959), Sinha and Prasad (1959), Sinha and Sinha (1960), Upadhyaya (1968) and Upadhyaya and Sinha (1968) are worth mentioning.

Despite the fact of the lack of communication between individual researchers, a trend towards increasing methodological sophistication can be definitely discerned. Of late, new experimental designs and paradigms have been tried. This sophistication needs to be pressed into the service of a more rigorous analysis of variables and a more deliberate and concerned theory testing and theory construction. Again and again, the need is brought home for a sizeable group of researchers jointly, deliberating and exploring certain research area over years. This may raise the level of information and the capacity to make creative contribution to the subject. Instead of sporadic and casual attempts, there should be unified and extensive study of PA learning so that significant results can be obtained.

Retro-active Inhibition and Interference

This area has been rather extensively explored by Indian psychologists. Kundu (1949) examined RI as a function of the time of interpolation. Such work was based on a sound understanding of recent RI theories including the two-factor theory. Shanmugam and Santhanam (1965) examined interference of serial learning by mental stimuli presented at marginal visual level and verified the hypothesis that meaningful words interfere more than neutral stimuli. Das (1954) and Kothurkar (1968b) probed the similarity dissimilarity characteristics of interpolated learning in relation to its effect on RI and LTM and STM respectively. All in all, a sound base for qualitative and quantitative memory work has been laid.

Recall-reproduction, Recognition, Reminiscence

Memory processes of recall, reproduction, recognition and reminiscence, singly or in their various interlockings, have received considerable attention from Indian psychologists. Those who worked with Bartlett often showed real zest for memory research. Davis and Sinha (1950) studied the effect of one experience upon the recall of another and supported the notion of merging of experiences. Adinarayan (1958) experimented with Bartlett's serial reproduction method and confirmed his findings. Zachariah (1958) studied the accuracy of the reproduction of visual images and observ-

ed that it increases with age. Younger subjects did better in immediate reproduction while older ones improved in delayed tests. Das (1964b) analysed the interrelations between recall and recognition by typical Bartlettian methods and materials.

Recall and Recognition

Kothurkar (1965a, 1965b) reported a series of five experiments designed to check the alleged adverse effect of interpolated recall on recognition. Using diverse materials and using nearly six times the original number of subjects with all manner of replications, extensions etc. he, along with others, failed to obtain any evidence of a depressing effect of recall on recognition. Devi (1963), Majumdar (1963) and Pande and Rajkurne (1967) examined the reminiscence phenomenon. The first investigator verified that it depends on the type of material and age; Majumdar attributed improvement in performance after rest (motor learning) to dissipation of reactive inhibition and Pande and Rajkurne felt that, after all, reminiscence may be an arti-fact and not a fact.

Verbal Conditioning and Probability Learning

The conditioning model and mood enthused a group of workers active in the area of verbal behaviour at the Utkal University, to undertake a number of experiments on verbal conditioning and allied problems. Das (1965a) conducted some studies on the role of reinforcement which extended the validity of Spence's hypothesis concerning the differential growth of a frequently and an infrequently occurring habit in selective learning. A study by Das (1962a) comparing non-verbal primary reinforcement (electric shock) with verbal reinforcement ("right" or "wrong"), showed that the speed of acquisition or reversal was not differentially affected in the two reward conditions, but that the responses of the shock subjects were markedly stereotyped. It was hypothesized and experimentally verified that the need for social approval (social reinforcement) was greater in retardates than in the normals as the former were likely to be socially deprived.

Das conducted a group of experiments (1962b, 1964a, 1965b, 1966, 1968) on semantic satiation demonstrating a high positive relationship between poor vigilance and low satiation scores and suggesting that the lack of concentration results in poor satiation. It was observed here that good conditionability was positively associated with resistance to semantic satiation. On the basis of a number of experiments on conditionability, suggestibility, hypnosis, etc. Das

(1958, 1961b, 1962b) proposed that semantic satiation is a direct function of attentional decrement rather than of inhibition of meaning. He further proposes that susceptibility to hypnosis depends upon the subject's ability to develop conditioned responses to words and his ability to have selective cortical inhibition.

George, Devadasan and Dharmangadan (1967) also found significant correlations between conditionability and suggestibility.

Dixit (1969a, 1969b) reports two experiments emphasizing the role of awareness and sex of experimenter as variables in verbal conditioning. He propounds that what is learned in verbal conditioning is the awareness of response reinforcement contingency and finds it useful to integrate the results of verbal conditioning within the cognitive learning theory.

Das and Dixit, through their independent studies, cover a broad spectrum of interpretations of verbal conditioning from reinforced stimulus response associations to awareness of different response-reinforcement contingencies. A determined effort must be made to sort out these intriguing theoretical issues as also to seek useful applications of contiguity and reinforcement models, say, to language learning.

Probability Learning

A group of common problems and experimental procedures help us to identify a separate variety of learning as probability learning. Das (1963, 1964b) and Panda and Das (1964) examined the role of variables such as knowledge of results, type of reward, age, overlearning etc. in a series of experiments on probability learning. They characterized probability learning as a form of classical conditioning in so far as the guessing behaviour of subjects was conditioned to the rate of stimulus occurrence.

Two experiments were carried out by Kothurkar (1965a, 1965b) to ascertain transfer effects in probability learning, using different ratios of binary symbols. Transfer effects were clearly indicated and were greater over tasks involving smaller differences and lesser over those with larger differences in their probability ratios. Subjects match more directly and effect a more general adaptation to the changed levels of stimulation. Kothurkar (1968a) tentatively suggests that transfer in probability learning is mediated through the perceptual factor of discriminating between old and new frequencies when the difference between them is relatively large and striking. And an almost unwitting process of matching or adjustment comes into its own to account for transfer when differences in probability schedules are relatively small. He proposes to describe

probability learning as a perceptual orienting response learning.

Association Values, Meaningfulness and Meaning

Indian researchers in verbal learning often felt the need of standardized verbal materials which would be more congenial to Indian populations. Isolated attempts were made to carry out some normative studies of associative counts, meaningfulness (after Noble's m) etc. by Kanungo and Panda (1963, 1964), Agarwal and Kuppuswamy (1956) and Pandharipande (1967). Multiplicity of Indian languages might be a major limitation on concerted effort and common use of such tables of frequencies. There is need for collection and systematization of such isolated studies.

We find a study of word association by Das (1944). Turning to more substantive studies, De (1957) questions the diagnostic use of word associations.

Short-Term Memory

The tremendous western lead in this area was recently picked up by some Indian psychologists already working in the field of remembering. A study of the awareness of mistakes in short-term memory by Das (1965) clearly indicates a Bartlettian as well as contemporary influence. It is suggested that interpolated recall depresses awareness of mistakes perhaps through confusion and interferes with clear recognition. Sen (1966) studied the effect of stimulus length and display time in short-term memory among imbeciles. Due to limited input capacity, faster rates resulted in poorer recall while slower rates showed no further gain. The optimum rate of presentation was determined.

Two experimental studies by Kothurkar (1968a, 1968b) bear out the assertion that the probability of short-term recall of verbal units is adversely affected by the similarity of interpolated items. The results broadly corroborate and support the interference hypothesis as a major explanation of short-term forgetting and of the decisive role of similarity. Acoustic similarity of interpolated material to that in store depresses short-term recall of words.

Animal Learning

Perhaps some work in this area may be included in the review of comparative psychology. It will, however, not be inappropriate here to review studies pertaining to animal learning. Research in this area has not yet established itself on a broad continuing basis,

although things have lately started to brighten up. Mukerji (1954) studied the reaction of Goldfish to colours. Kuppuswamy (1942) reports a series of objective studies on 'Experimental Neuroses' and concludes that behavioural abnormalities of rats in a stressful situation are only transient emotional reactions and should not be taken as 'neurosis' which is a general, persistent abnormality.

Pal and Singh (1965) studied the effect of sound vibration on rat behaviour and found that such vibrations caused disturbance in the neurophysiological control of behaviour.

Mukherjee (1966, 1967) reports two studies on the schedules of reinforcement in instrumental (operant) conditioning. In the first, he tested the hypothesis that if the duration of fixed interval (F.I.) is increased, the response rate decreases. Here the direction and sequence of shifts do not condition this gradient function irrespective of value, direction and sequence of F.I.s. The second study is specifically concerned with the effect of shifts in fixed interval schedules on acquisition, extinction, spontaneous recovery and reacquisition. The extinction data showed that the experimental group of rats exposed to the ascending order shift pressed the bar more than the descending group. Therefore, it is concluded that the persistence of non-reinforced responding is a function of the direction of shift in fixed interval values. The analyses suggest a higher acquisition level for the experimental ascending group than for the other groups. These results are explained in terms of Hull's habit strength theory.

Paul (1966) investigated the effect of odour trails in open-field behaviour in rats. Chakrapani (1969) compared two groups of rats subjected to two different levels of anoxia [20,000 ft. (Group I) and 30,000 ft. (Group II) equivalents of altitude] on a vertical-horizontal discrimination problem. The number of trials taken to learn the discrimination habit did not differentiate the experimental and control groups. However, Group II made significantly more errors.

Motivation for Learning

In comparison to the amount of theoretical discussion of the instinct theories of motivation, biological and social motives, wants and goals, and the role of rewards and punishment in training-learning, experimental work on motivation has been really very little. Kothurkar (1955a) demonstrated that, upto a point, voluntarily induced muscular tension has a facilitative effect on the speed and accuracy of the mirror tracing performance and suggested a curvilinear relationship. Moderate degrees of tension facilitate learn-

ing and performance. Lakshmi (1967) tried a new theme and experimentally established relationship between the rate of learning and achievement motive in High School boys. Fast learners had higher n-achievement than slow learners.

Sinha and Asha Lakshmi (1968) drew attention to some new variables of learning in the form of demand characteristics of the learning situation and the dependency on the part of the subject. Such diverse variables influencing learning widen the scope of the control of human behaviour.

In this area, a level of sophistication has been attained so that it will be possible to pursue further purposeful and focussed research. Transfer paradigms, proactive and retroactive inhibition and mediation processes invite experimental investigation from interference theorists in India.

A sound base for qualitative and quantitative memory work has been laid over the years. The modern 'tip of the tongue' phenomenon has an Indian background in the recall of forgotten names (Kothurkar, 1950). Both long-term and short-term memory processes need to be explored in the light of the information theory. Short-term memory comes very close to perception-attention and it is suggested that inter-relations between the two and verbal learning and conditioning should be more intensively investigated.

Indian researchers in verbal behaviour and verbal learning often feel the need of standardized materials which would be more congenial to Indian population. There is need for encouraging collation and systematization of such isolated studies. It is suggested that such normative studies should be deemed as suitable problems for careful Ph.D. work.

VIII. Thinking and Problem-Solving

The question of 'How we think the way we think' has been one of the oldest interests of human intellect. However, a scientific study of thinking is a characteristic of this century. Analysts, associationists, factor psychologists and Gestaltists have done a good deal of work outside the laboratory. Many studies have pointed out that 'thinking' is amenable to experimental controls. In the laboratory, 'thinking' is studied from two points of view. The first is that of tracing and analysing the process of thinking; and the second is that of finding the effects of variables on the product of thought. Generally, Indian workers have dealt with the second type of experiments. They have entered this field only very recently and have studied effects of variables such as age, sex, intelligence and personality characteristics. S-variables as a method of stimulus presentation and

A-variables as mediated learning have been used.

Sinha (1959) noted that high anxiety subjects take significantly more time to complete problem-solving tasks. Other psychologists have pointed out factors and conditions that facilitate concept attainment and formation. These factors are reflection time (Mukhopadhyay, 1960), higher age (Rangamani, 1967), higher level of mediated generalization (Arundale and Chandra, 1968), simultaneous presentation of stimuli (Rai, 1968), and higher intelligence (Sinha, 1968). Upadhyaya (1968) challenged the old theory that reversal treatment results in retardation. He used reverse cues in pre-solution period and found no retardation in subsequent performances. Rao (1965) tried to determine experimentally the effects of dispositional variables on performance and strategy in concept learning and found that, when task variables are held constant, the kind of strategy adopted is a function of dispositional variables, like intelligence and ego-strength. Contrary to general supposition that competition inhibits creative thinking, Raina and Chaturvedi (1968) showed that ideational fluency score increased under competition.

These studies cover a wide range but leave still wider issues untouched. The unexplored topics that attract attention are effects of set, rigidity, and functional fixedness on problem solving. Analysing the results for age, sex and personality characteristics will definitely yield worthwhile results but may not help our progress towards superior techniques. Little research has been done by us on the process of thinking. This area is yet to be deeply investigated by modern psychologists. There are some controversial topics such as creative thinking in laboratory, improvisation, the process during the stage of incubation, the nature of illumination, solution and composition solely by trial and error method, etc. In this area of productive thinking and creativity Mukhopadhyay and Malani (1960), Raychaudhari (1966a, 1966b) and Maitra, Mukherjee and Raychaudhari (1967) opened the first Indian experimental approach, and one can contribute here to a great extent. Interrelations of learning and thinking offer a challenge to the laboratory psychologist.

IX. Psycholinguistics

Though some traditional but bold attempts have been made by Bose and Ganguli (1951), Bose (1943, 1947), Gupta (1947), Jalota (1933), Latif (1934, 1935), Prasad (1940, 1941, 1944), Prasad and Asthana (1947) and Sekhar (1948), this is still a very neglected area of research in India. In some centres, the common problems bet-

ween linguistics and the psychology of verbal behaviour may be explored under the rubric of psycholinguistics. Perceptual and cognitive aspects of speech could be examined after the speech-recognition model of Hall and Steven's. Skinner's functional analysis of verbal behaviour, studies of verbal conditioning, speech perception and semantic aspects of words (including semantic satiation) could be further explored. A determined effort must be made to sort out the intriguing theoretical learning issues as also to seek useful applications of contiguity and reinforcement models, say, to language learning. Skilled and ingeneous workers may devote themselves to the applied aspects of the psychology of human learning, say, developing specific programmes of teaching Indian and foreign languages. Programmed instruction may fruitfully be pursued and implemented by devising inexpensive teaching machines which will guide correct education through the feedback of appropriate signals. With the help of the science and technology of language learning, workable knowledge of any language can be given within six months. This opens many opportunities of applied research. The modern technology of language learning has great useful potential on the contemporary Indian Scene. Multi-lingualism is a necessity for quite a few and hence one should encourage devising short efficient courses for learning Indian and foreign languages. A possible step towards genuine national integration and international understanding could be taken by instituting inter-lingual courses of study in various Indian Universities. Schools of these modern languages should have language laboratories equipped with various linguagadgets. These facilities will encourage research on correct pronunciation and intonation in the study of language-aspects which have been sadly neglected in the past.

Summing Up

In this review, challenges, successes and failures of experimental psychology in India over the last fifty years or so have been discussed. We may now make a brief statement of present trends and future direction in which research should proceed.

The general pattern of development as outlined here is one in which a period of promising early growth was followed by a slump and recovery. Originally Indian psychologists followed the psychologists of Germany and England; and lately they have come under American influence with greater emphasis on the applied side. Experimental psychology had a certain initial advantage and, hence, perhaps more work is done on general problems than on any other speciality. The early psychologists had to be experimentalists as there

were very few alternative distractions or developments. The specialised movements took some time to reach India. However, experimental psychology cannot be said to have established itself. It has no distinctive achievements to its credit. Its teaching has been modernized, its purposes have been defined and improved methods have been adopted. It is yet to be graced with fruitful ideas and pursued with consistent effort and devoted work. It is often a story of important names with inconsequential performance and insignificant impact. We can make an impact only by a genuinely brilliant idea or through persistent, dedicated effort. The stage is now set for such an effort if proper orientation is given.

Again, we have to work against the tendency to think that all knowledge necessarily flows from Western springs. This often results in discouragement and neglect of our own talent and research potential. Because of lack of prestige, even good researches reported in Indian journals do not evoke the right kind of response and do not lead to any positive chain reaction. They also do not lead to cumulative, sustained work, either in appreciation or criticism. Only sporadic flashes are seen. There is, thus, need to encourage communication and co-ordination among like-minded workers. Centres of common interests have to be developed. Often there is practically no dialogue among Indian psychologists, partly because there are not enough psychologists actively and continuously working on a topic and partly because such persons as are working in a given area do not meet to plan joint programmes of work and discuss the results already obtained and the theoretical issues arising out of them. The sociometric picture of Indian research in experimental psychology is hierarchical, star-shaped with most of the channels of communication and influence radiating from some Western centres, in one-way flow. Such chronic orientation towards and exclusive dependence on Western leadership are not likely to develop indigenous centres of expertise and bold local initiative. Outstanding research in experimental psychology must not remain an exclusively Western enterprise. On the contrary, we must develop a truly democratic net-work of shared research responsibility and the free flow of scientific communication in many reciprocally reinforcing lines.

It is disturbing to note that many of the leaders of Indian psychology are not in the field of experimental psychology and are working in other specialities. Lately, the contributions to research journals are from the second, third, or even fourth line of workers in the hierarchy of academic community. This state of affairs is not conducive to enhancing the prestige of our scientific communications, although it might be gratifying to the authors that they are doing

their duty. Mere teaching, examining and organizational work does not absolve first rank seniors from their research obligations.

On the whole, things are looking better—more research is conducted and reported by more people—mostly young people. They are our hope. To obtain better results, organizational and financial aspects of research will have to be attended to. But even on an individual basis, there is enough scope for broadening and deepening our scholarship and for conducting short-term research projects which do not entail large financial investments.

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5

Industrial Psychology

A Trend Report

By

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Introduction

THE AMOUNT and quality of research work in any branch of science, especially in the applied field, depends upon the demand for such services, the availability of personnel competent to conduct such work, the level of sophistication of the science itself, and its capacity to solve problems and produce results applicable to human welfare. The last factor hinges on the availability of research techniques and tools and also on the amount of confidence the discipline is able to generate with regard to its capacity for yielding useful results. For various reasons, psychology (and especially its applied aspect) has for long lagged behind on all these counts, and several impediments have retarded the development of both pure and applied sides of this discipline in India. The government and industries—the agencies which usually sponsor researches in the industrial field—have not shown adequate confidence in the competence of this young science. Psychological researches in industry have therefore largely arisen because of the initiative of persons working in universities and educational institutions. The work has thus been of academic orientation rather than that of a discipline likely to produce immediate and useful results capable of application in industry. It is mainly for this reason that research in the field of industrial psychology has for long remained retarded in India.

During the pre-independence era, a major portion of the research in the field of industry had been conducted by economists. Psychologists were late in entering the arena, mainly because of inadequate development of the subject itself in India. With the establishment

of departments of psychology in different universities, and availability of competent personnel many of whom had received their training abroad, the situation changed very considerably. This was reflected, not only in the nature of problems taken up for investigation and the volume of researches conducted, but also in the sophisticated nature of methodology and tools used. But, by and large, the psychologists who have worked in the industrial field have modelled their researches largely on those conducted in the west and have not always displayed resourcefulness, inventiveness and consciousness of unique problems pertaining to Indian conditions. Problems which have been taken up for study are often a replication of work done abroad. Fortunately, the situation has considerably improved during the last decade or so. An improved understanding of what this discipline can do in increasing industrial efficiency and fostering insight into labour-management problems, as well as the greater availability of competent personnel who can conduct useful researches have given considerable impetus to psychological researches in industry. Moreover, the new generation of industrial managers is also more enlightened and is becoming increasingly aware of the useful contribution which the psychologist and other behavioural scientists can make to improve industrial management. As a result, not only has the number of researches in the industrial field gone up considerably, there is also a small but distinctly perceptible demand for the recruitment of psychologists in governmental agencies and private industries in various capacities to work on human problems facing the industry. As a consequence, both the volume and quality of psychological researches in this field are likely to go up still further in the years ahead.

This survey tries to give an overview of the researches in one of the applied fields of psychology viz., industrial psychology, during the fifty years that have elapsed since the founding of the first department of psychology in the country in 1919. The initial growth of researches in this field has been extremely slow. Out of the 533 published and a few unpublished studies reviewed in this survey, only about 25, i.e., about 4 per cent belonged to the pre-independence era. Five hundred and eight of the studies, i.e., approximately 96 per cent were conducted since independence (Table I). The growth of researches in the field of industrial psychology is thus a comparatively recent phenomenon in India.

In Table I, all the studies reviewed between the years 1926 to 1969 have been grouped under eleven subfields. Ten of these subfields are common to the scheme of *Psychological Abstracts*. But in view of the fact that quite a large number of studies reviewed were surveys containing valuable information on some psychological

TABLE I

Number of Studies in Different Subfields
Before and After Independence

Serial No.	*Subfields*	*Upto 1947*	1948-69	*Total*
I.	Vocational Choice and Guidance	1	36	37
II.	Selection & Placement	4	63	67
III.	Training	0	11	11
IV.	Task & Work Analysis	6	24	30
V.	Performance & Job Satisfaction	5	139	144
VI.	Management and Organization	0	128	128
VII.	Special Environment	0	27	27
VIII.	Advertising & Consumer Psychology	0	3	3
IX.	Engineering Psychology	0	14	14
X.	Driving & Safety	1	23	24
XI.	Surveys & General Studies	8	40	48
	Total	25	508	533

TABLE II

Number of Studies Reported During 1926-1969
by Four-year Periods

Years	*Number of Studies*
1926-29	2
1930-33	0
1934-37	1
1938-41	2
1942-45	9
1946-49	30
1950-53	45
1954-57	69
1958-61	97
1962-65	115
1966-69	148
Unpublished 1970	15
Total	533

FIGURE 1

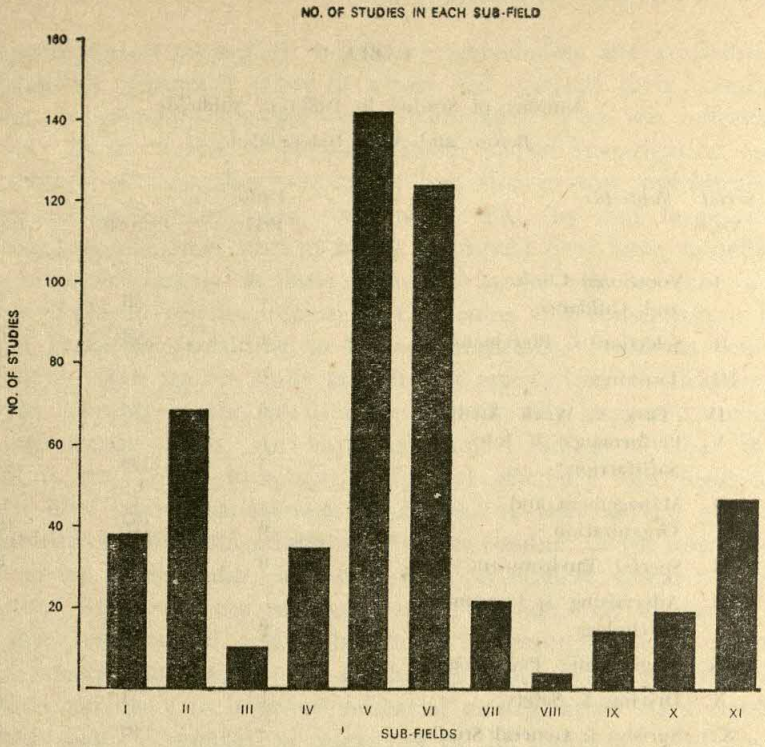
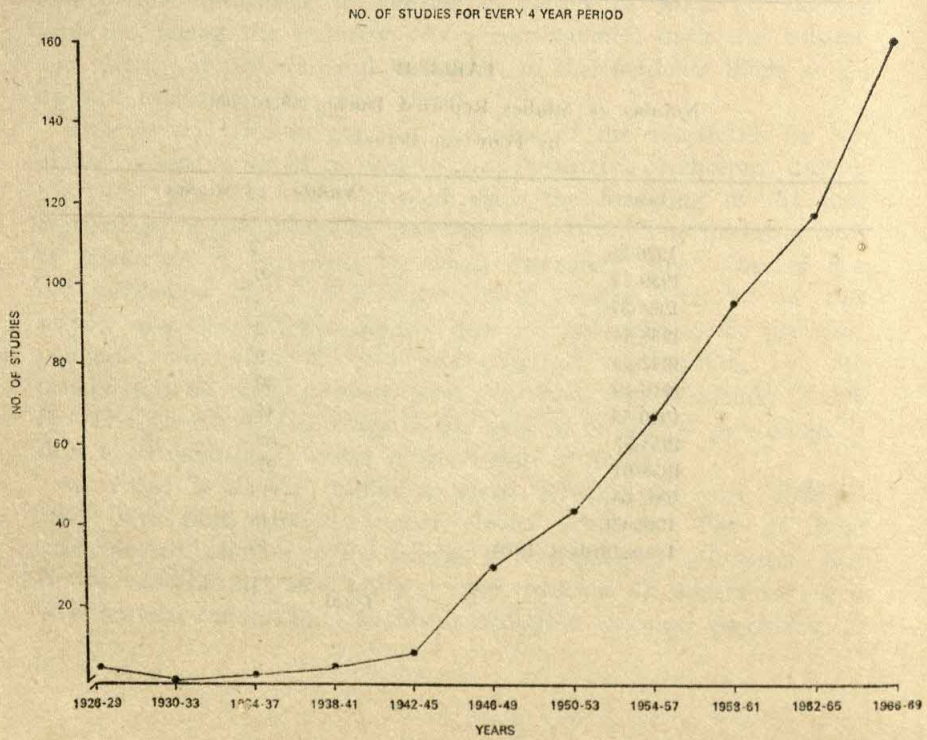


FIGURE 2



aspect of industry, an additional category for classification was added, viz., "surveys and general articles". As Table I would indicate, the articles falling under the different subfields vary greatly in number. While performance and job satisfaction, and management and organization are favourite areas of research for industrial psychologists in India, the areas of business and consumer psychology, banking and engineering psychology have been largely neglected. Almost about a tenth of the studies reviewed (9.7%) were survey and general articles. Further, a scrutiny of the studies under each subfield reveals quite a large number of them to be non-empirical, consisting of purely theoretical discussions. Out of a total of 533 researches, no less than 145 (i.e. 28.7%) were non-empirical in character. The number was especially large in the area of management and organization, constituting more than 45 per cent of the total number of studies in the subfield.

Pre-independence Studies

The development of the subject has been sluggish in the pre-independence era, there being only about twenty-five studies which come under this field. Task and work analysis, performance and job satisfaction, and selection and placement appear to have received more attention (Table I). The only study on vocational choice and guidance (Roy, 1943) analysed the performance of the mechanic on a number of foreign psychological tests with a view to determining the job requirements in terms of test scores. In the field of selection, studies generally concerned the determination of reliability and/or validity of Indian adaptations of certain foreign tests of intelligence and other traits (Jalota, 1940; Bose, 1947; Ghosh and Ghosh, 1945). Shukla (1947) using a number of psychological tests made a statistical analysis of the selection procedure of the I.C.S. and other services.

One of the two earliest studies made in the field of industrial psychology in India have been in the area of task and work analysis. Using Mosso's ergograph, Maity and Sinha (1926) analysed the individual differences in the pattern of muscular work and observed individual differences in fatiguability. Other studies have also concerned with work analysis with the help of ergographic, and reaction time measures (Banerji, 1935; Narain, 1944; Asthana, 1944). Asthana (1945, 1946) conducted two studies on the effect of unpleasant olfactory stimuli on ergographic work and interpreted the findings in terms of Fere's hypothesis of the dynamogenic effect of sensation.

Out of five studies in the area of performance, we have one of

the earliest studies by Sen Gupta and Sinha (1926) modelled on Floyd Allport's study of differential effect on output in along-and-together situations. Other studies were mostly theoretical in character pertaining to absenteeism, problems of morals and a general analysis of causes of strikes.

The areas of training, management and organization, special environment, advertising and consumer psychology, and engineering psychology have remained neglected. One study of driving and safety reported in the *Indian Journal of Social Work* (1946) dealt in a general manner with the problems of safety, health and welfare of workers.

Of the eight general and survey studies, Brandt (1946), and Bose (1947) have dealt with the role of psychology in industry. Others are mostly survey type, analysing wages, hours of work, working conditions, health, welfare, income expenditure, indebtedness, occupational disease and other facets of the worker's life, and contain useful information of a psychological nature on hours of work and working conditions as related to efficiency.

A general glance at the researches during the pre-independence years brings out their theoretical and general character. Those dealing with selection and placement mostly concerned with the problem of reliability and validity of one or the other western tests and their adaptation in India while, in the field of task and work analysis, emphasis has been placed on ergographic analysis. Excepting that of Sen Gupta and Sinha (1926), the studies on performance were again general in character. Researches were mostly theoretical in nature, constituting either a general analysis of phenomena like absenteeism and strikes or they were surveys into different aspects of industries.

Researches since Independence

Before 1947, excepting for the two steel plants in the private sector, engineering industries, light or heavy, were largely non-existent. Textiles, jute and tea were the major industries. Studies during the pre-independence era were therefore mostly conducted in plantations and textile mills. In the post-independence era, however, rapid growth of industries has acted as a spur to researches in industrial psychology. The work has also become more systematic and there has been a broadening of interest so that almost all the major fields of the subject have been touched.

I. Vocational Choice and Guidance

Almost all the areas of this sub-field have received the attention

of the investigators. Considerable emphasis appears to have been placed on factors influencing vocational preference and choice. Factors like identification (Mehta, 1955), motivational factors (Sinha and Dash, 1959) and regional differences (Krishnan, 1961) have been analysed. Mehta (1961) analysed the work values of individuals and found that they affect productivity. Studying job preferences among adolescents, Kanungo and Panda (1966) found girls to have more restricted choice of vocations than boys. Medical, engineering, law, teaching, research and administration were the indicated professional hierarchy. Singh (1965) determined the social distance among four occupational groups. Professors were found to have the highest 'nearness' score and businessmen, the lowest.

A number of studies on occupational values, preferences and income aspirations as related to different occupations and groups of subjects have been conducted. Social service, fame and security were found the three most preferred, and power, leadership, and self-expression as the least preferred values in the male postgraduate students (Pestonjee, Akhtar and Chaudhari, 1967). Pestonjee and Akhtar (1969) analysed the occupational value preferences and income aspirations of engineering students and teacher trainees, using Centre's Job Value Cards. Sex was found to be a significant determining factor underlying occupational values, preferences and income aspirations (Akhtar, 1969a). A significant study in the field has been done by Ganguli (1957e) in which length of service and total income of the workers were found to be related with expected income. Income aspiration was an important factor underlying job satisfaction. Workers with high financial expectations were significantly more dissatisfied than those with lower aspirations.

Studies by Joshi (1963a; 1963b) have revealed significant association between intelligence and vocational aspiration. Sinha, Prasad and Madhukar (1964) have observed extraverts and ambiverts to be more rigid with regard to their vocational aspirations. Sharma (1969b) has analysed the background characteristics associated with high vocational aspirations in a group of auto-workers.

In India, due to the weight which tradition, caste and family considerations have in the choice of vocations and the impact of the same on the rapid socio-economic changes that are taking place in the country, it is but natural that many investigators should have tried to identify factors in vocational choice and determine the social prestige and status image of different occupations. Krishnan (1956) has emphasized regional differences and the factors of caste and socio-economic groups. Cook (1962) investigating the prestige values of typical Indian occupations found those with high prestige to be characterised by high salary potential, advanced education.

and high social status. A tendency for occupational prestige in India to get linked with job security and economic reward was observed. Bopegamage and Veeraraghavan (1967), in their UNESCO monograph, studied the subjective assessment of status in Poona and Coimbatore regions among the rural and urban communities. Stratification pattern seemed to change under the influence of industrialization and unbanization processes.

In view of the special importance of the job status and status images in the changing socio-economic pattern of the community, investigators have rightly focused their attention on their analysis, and an indigenous body of research on occupational prestige and preferences has grown up. There is, however, need for more systematic and wide scale study of this problem to isolate the socio-cultural factors that operate as well as the modifications that are coming about with the rapid socio-economic changes taking place in the country.

In view of the great demand for admission to engineering and medical courses, it is natural that these professions have received the interest of vocational psychologists. Studies have sought to analyse the interest pattern (Chatterjee and Mullick, 1961), differential image (Misra, 1962), and their proficiency in academic subjects (Deb, 1964). Pal has made an elaborate personalistic study of students of engineering, law, medicine and teachers under training (1968b), and determined their value patterns (Pal, 1967a), personality needs (Pal, 1968a), and personality adjustment (1968c).

Sinha and Niwas (1958), using modified form of Strong's Vocational Interest Blank, studied the vocational choice and the motivating factor behind it on a sample of male and female university students. Singh (1967) adopted the Kuder Preference Record Vocational Form and reported the details on its item analysis, reliability and validity.

Apart from empirical studies, two general studies may be mentioned. Sinha (1956a) has analysed the problems of vocational guidance in India, and Verma (1963) has focused his attention on the acturial method as against the thematic extrapolated methods of vocational guidance.

This review of the 35 studies indicates that almost all the areas of the subject have received the attention of the investigators. One would, however, tend to agree with Mehta (1961) that research on basic issue of guidance, apart from test construction, is still in its infancy in India.

II. Selection and Placement

All over the world, psychologists in industry are most frequently

employed for purposes of selection and placement services. In India, this does not seem to be the case and it is rarely that industries have employed psychological techniques in their recruitment. The situation seems paradoxical because, in Indian universities, a very large volume of work in psychology has centred on test construction and development, and adaptation of western tests to Indian conditions. This work has not made much impact on industries because very few of the tests developed have been on population other than students. Moreover, the managements have remained generally unaware of the benefits likely to accrue from a scientific selection programme. They are not much concerned with the problems of personnel selection because, with plenty of labour available, it is fairly easy to find replacement.

The work in this area may be grouped under six headings: (a) studies on the development of tests for selection purpose; (b) studies on the determination of ability requirements; (c) methodological analysis of some selection techniques; (d) selection of executives; (e) employment of handicapped persons; and (f) studies on the unemployed. Das (1962) presents a good review of the personnel selection methods.

(a) *Studies on the Development of Tests for Selection Purposes*: Studies in this area have mostly been concerned with the development of aptitude tests or a battery of tests for various categories of personnel and the reporting of details of item analysis, reliability and validity. This category includes studies by Amin (1952) on selection of weavers; Das, Akbar, and Singh (1965) on visual signallers in the navy; Ghoshal and Singh (1965) on railway apprentices; Mukherji and Deb (1963) on biri-binders; Das (1963) on gun control trainees; Ghosh (1952) on semi-skilled match workers; Sharma (1959) on sailors; and Chatterjee and Mukherjee (1964) on trainees for librarianship. Das (1959) has developed a battery of tests for card punch-operator trainees and has outlined the aptitude requirements. Das (1961) reports the validity of the use of non-verbal intelligence test and adjustment inventory and 16-PF questionnaire on the selection of pilots. Kale (1969) in his study on concepts and measurement of personality found a wide gap in personality traits as rated by the psychologists and traits as viewed by the supervisors.

(b) *Studies on Determination of Ability Requirements*: In view of the popularity of engineering and medical courses, psychologists have tried to analyse the traits of successful and unsuccessful students as well as persons in these professions. Chatterjee (1958) studied the vocation of medicine, while Deb (1959) analysed the abilities and requirements for success in engineering. Sinha (1960), Sinha and Misra (1961a, 1961b, 1963) have made a comprehensive study of

sociological and psychological factors in success in engineering. Sharma and Kalra (1960) have compared the performance of engineering and non-engineering students on a test of special ability. As regards other professions, Kundu and Ghosh (1967) have studied the personality pattern of pharmaceutical sales personnel, while Das, Kohli and Bharti (1965) determined the ability requirements of pointsmen/cabinmen in the Indian Railways with the help of psychological tests.

(c) *Methodological Analysis of Selection Techniques*: Some interest on the methodological problems in testing and personnel selection techniques has also been displayed. In a study reported in the *Indian Journal of Psychology* (1955), the effect of group on group testing officers' assessment in the Services Selection Board has been determined. Apte (1960) describes Posset's method and indicates its advantages. Hafeez (1966) analysed the application blanks in order to screen out items which may prove to be useful in character analysis. Das (1957a) studied reliability of interview data and errors of judgment. In another study, she (Das, 1957b) demonstrates how interview could be made more reliable with the help of quantitative rating form giving analysis of the qualities to be assessed by the interview in terms of job requirements and providing statement of those qualities which the interview board members can readily assess. Das (1958) has also suggested an alternative method of assessment for personnel selection, using behavioural indices. A quantitative method for screening letters of application has also been suggested (Das, 1959b). Rastogi (1960) makes an evaluation of the pool and decasualisation scheme to replace the *badli* system in industries in Kanpur. Dhingra, Pandey and Paliwal (1969) report on action research selection techniques for weavers. Ganguly (1961) provides the determination of acceptance points of test scores in a battery for selection in an industry.

(d) *Selection of Executives* : Executives of different levels have a special place in the success of any industrial undertaking. Professionalism in management still has a long way to go and selection of managerial personnel whether lower, middle or higher, has not always been done according to scientific principles. There are very few empirical researches into the selection of supervisors and other managerial personnel. Some studies, however, have been conducted on the selection of officers (Tyagi, 1964, 1965; Tyagi and Mehta, 1965). The aim was to identify personality, intelligence and background factors associated with success among the candidates selected for training at the National Defence Academy. Chowdhury (1958) outlined the advantages of group selection procedure for executives, and found that it produced confidence in the management's

fair practices. Rama Rao (1948) analysed the validity of officers selection procedure in the various services during the second world war. Muthayya (1969) analysed the personality and personal factors of administrative officers using E.P.I. and compared the scores with their subjective assessment of their occupational problems, achievement, satisfaction and their hopes regarding the country. Selection procedures used in Union Public Service Commission and other spheres have been theoretically analysed and investigators have recommended improvement and alternative approaches. Das (1957b) reviews the selection procedure of the civil service and industries in England and makes a case for their applicability to India. In another paper (Das, 1964), she recommends a "Systems approach" to the selection of officers. Adiseshiah (1961) makes a case for psychological criterion for administrative service while Chowdhry (1967, 1969) comments on the methods and the selectors in the Union Public Service Commission and discusses the implications of certain recent researches on the selection of executives and administrators.

The problem of selection of supervisors and officers in industry has not received adequate attention and no systematic research has been reported which has analysed the qualities required for successful executives at various levels or the effectiveness of various testing procedures.

(e) *Problem of the Employment of Handicapped Personnel*: The problem of employing the physically as well as mentally handicapped has been mostly neglected by Indian psychologists. The only significant study in the area is by Prasad (1961) who studied a group of visually handicapped persons in 32 industrial establishments in Madras. Most of them were found regular and punctual in their work and were rated as average in efficiency. On loyalty, cleanliness, ability to concentrate, and cooperativeness, they rated as good.

(f) *Studies on Unemployment*: The phenomenon of unemployment has not been systematically studied from a psychological angle in this country. Only four studies have appeared on the psychological facets of unemployment. Sinha (1957), analysing the attitude of the unemployed towards family, found them, as a group, to have the least favourable attitude. Those who depended on their parents for their maintenance possessed a more favourable attitude than the self-dependent ones. Das (1966) found 7.8 per cent unemployed to be neurotic, 25 per cent to be introverted, more than 68 per cent ambivert and 13.59 per cent below average and 76.69 per cent of average intelligence. Shantamani (1969) conducted a socio-psychological study of unemployed engineers. Veeraraghavan (1970) conducted panel interviews and prepared case studies of sixty unemployed males and determined the psychological impact

on their social status, family life, and attitude towards management, unions, government and society. The field is largely neglected and in view of the pressing problems of unemployment in this country, it deserves more attention from both personnel and social psychologists.

III. Training

Training facility, both for skilled and semi-skilled operators as well as for supervisory personnel, has of late been started in many industries. It has received special impetus through the efforts of National Productivity Council, various management institutes and some universities and educational institutions. Interest in supervisory training has gathered momentum with the introduction of Training Within Industry Programme in 1953 by the I.L.O. First introduced in Ahmedabad, it has extended to other centres. Reaction of the Indian management has been mixed while others are sceptical. Myers' (1958) comment still holds good: "It is fair to say, however, that a great many Indian managements still remain unconvinced or unaware of the value of planned supervisors and management training programmes, partly because the T.W.I. experience has been limited by the lack of staff." The centres where the supervisory training has received specific attention are Ahmedabad and Bombay. The number of studies conducted at the ATIRA [Chowdhry and Trivedi (1958), ATIRA (1960, 1969)] deal with the training of executives and the experience of T.W.I. and other supervisory development projects. Joseph (1968) identifies the supervisory training needs. Natarajan (1961) describes the various training programmes offered by SITRA and points to the creation of the feeling of participation with the management among the supervisors. Daboo (1961) describes the research activities of the TISCO and gives evaluation of the T.W.I. programme. Baumgartel (1965) experimentally analysed the changes in problem-solving ability accompanying participation in an intensive executive development programme, and found the beneficial results of participation. A few studies on the training of personnel in other spheres like labour welfare (Kudchedkar, 1967), extension personnel (Singh, 1967) have been reported while Ghosh (1964) analysed some factors associated with learning jobs.

In recent years, many industries have initiated their own training programmes for personnel of different levels. Sensitivity training and other techniques developed in the west are being adopted by many industries, and the National Productivity Council and other agencies have helped to organise programmes for various levels of

executives. In spite of widespread interest displayed by the industries, the Indian psychologists have generally neglected the scientific study in this area. Psychological journals rarely contain reports of studies on the factors associated with training, application and development of psychological techniques or on evaluation of the effectiveness of the training programme on different levels of industrial personnel.

IV. Task and Work Analysis

Most of the 35 studies in this area have dealt with the determination of reliability, validity and evaluation of certain techniques of work analysis. Work at ATIRA concerned various aspects of workload by 'snap' method (Chowdhry 1950, 1960c; Chowdhry and Amin, 1952a, 1952b). Amin (1957) describes the techniques of worker-management participation in such studies and explains its psychological significance in implementing the findings in an industrial organisation on the basis of direct observation of workers classified as *high* and *low* as a result of time sampling. Mitra and Misra (1962) determined the major characteristics of workers on the automatic looms. Bhagoliwal (1960) describes the technique for the analysis of non-repetitive job of research scholars, stenographers, office workers, and laboratory assistants. Chatterjee and Mukherjee (1963) determined the reliability and validity of co-workers' ratings on efficiency of others. Halo effect was observed to be high in the ratings and there was high agreement between the ratings of co-worker and those made by senior officers. Das (1960b) compared worker analysis ratings based on job description and motion and time study on three types of repetitive tasks, and found 79 per cent agreement between the two methods, correlation coefficients being .53, .56, and .52 respectively. Bhattacharya (1961) used motion and time study for redesigning work-place layouts. Kalra and Sharma (1959) conducted job analysis by three methods, viz., spot observation, a detailed observation of the job, and a combination of both. The combined method had greater reliability than any single method. Sharma and Kalra (1959) reports on experimental investigation on the reliability of job analysis. Joseph (1968) analysed the rank rating of industrial workers by rank comparison method.

Studies on job evaluation are very rare. Chowdhry and Trivedi (1953b) at ATIRA attempted to rationalise the wage differentials, using factor analysis, and determined the relative importance of different factors like responsibility for equipment, skill, mental effort, responsibility for materials, responsibility for work of others, hazards, working conditions and physical effort.

Studies have been conducted to determine the effect of fatigue and rest pauses and the determination of workload. The investigation made by Prasad (1950, 1952) on textile workers in Kanpur happens to be one of the earliest in the field. Using a number of indices of fatigue like interview and test of steadiness, disc-dotting and ergograph, morning shift was found to show better performance. The relationship of fatigue with a number of variables like age, season, family-size, and distance of workers' dwelling was also observed.

Gupta and Rohnert (1964) studied muscular fatigue with the help of a number of physiological indices during transport of load in the horizontal plane. Datta, Roy, Chatterjee and Mallick (1968) analysed the energy lost in carrying and dumping earth at building site.

Amin (1949) investigated the effect of rest period on productive capacity and health; and Mohan (1967) analysed the psychomotor performance in relation to rest. Investigators at the Central Labour Institute (Sen, Chatterjee, Saha and Fletcher, 1964) have tried to rationalise the work period and rest pauses on a scientific basis in a steel rolling mill in Bombay with a view to increasing efficiency.

A few good general articles on merit rating (Desai, 1967), job analysis and placement of workers (Lundgren, 1953) and a review of researches at the Indian Statistical Institute on the methods of evaluating individual performance in industrial and educational settings (Das, 1965) have been published. By and large, systematic researches on the techniques of work analysis and their reliability and validity are lacking.

V. Performance and Job Satisfaction

Psychological researches on job attitudes, incentives, absenteeism, and on problems of industrial relations have been numerous. The case with which the common survey techniques of social research are applicable to this field as also the greater consciousness on the part of Indian psychologists of the factors operating in the social milieu have been responsible for this bias. The work has taken more or less the same lines as the social industrial psychological researches in the United States. Most of them directly or indirectly deal with attitudes and perception of workers and there is seldom, if ever, any use made of small group research techniques or direct experimental approach.

In the field of performance and job satisfaction, some 144 studies were reviewed constituting almost 27 per cent of all the studies. The

field appears to be the favourite area of research for the industrial psychologists in India.

Motivation and incentive have been studied by many investigators. Ganguli's (1961) monograph, *Industrial Productivity and Motivation*, presents the findings of his own researches on the relative importance of different incentive factors and compares the same with studies made in the west. Faroqi's (1962) article in *Papers on Industrial Psychology* provides a good review of researches on incentives.

Incentive is a significant industrial problem. The studies so far made have generally been concerned with determining the perceived importance and ranks of wages and other incentive factors. They lack in systematic analysis of the question of incentives to industrial workers as related to various socio-psychological variables and their impact on workers.

Mukherjee (1962) focuses his study on the efficacy of economic incentives and analyses their effect on industrial productivity. Bose (1948) and Ganguli (1953) have studied the influence of wages on employees' morals. In a number of studies, Ganguli (1954d, 1956) analysed the relative importance of different incentive factors motivating the Indian workers and has observed wages and security to be of greatest significance—a finding that differs from what is usually found among workers in the west. Pestonjee and Akhtar (1969) and Akhtar and Pestonjee (1969) also studied the relative significance of ten intrinsic factors. Advancement, participation, security, and recognition were rated more important than pay. Desai (1968a) investigated the motivation of white-collar workers, and Gupta and Hundal (1968) studied the financial incentives with different time-schedules among low paid industrial workers. Das (1960c) made a comparison of job incentives of engineers and trade unionists and their perception of workers' incentives. Datta (1959) using a paired comparison method determined the relative importance of several motivating factors on a sample of workers from industrial and commercial firms. Thanga (1959) analysed the level of aspiration of workers in a telephone factory. Bhatt's (1962) enquiry revealed that, of the nine possible incentives, choice of work, advancement and co-workers were preferred, in that order. The fifth place was a tie between benefits, conditions of work and supervisor. Then came security, hours of work and holidays. The finding is a surprising one and conflicts with the results of other investigators.

Not many experimental studies on motivation and incentives have been conducted. Investigators at ATIRA have determined the effectiveness of group norm as a method for increasing production in loomshed (Chowdhry and Trivedi, 1952). Hundal (1969) experi-

mented on the motivational effects of knowledge of performance on a repetitive task. Faroqi (1966) analysed the group task motivation.

Studies on the hierarchy of incentives have often yielded confusing results. Quite frequently wages and security have been given the most prominent place. In other studies they are relegated to a comparatively lower rank. Such differences are attributable, partly at least, to local conditions prevailing in the factory. But looking at the various studies, it is difficult to get a clear picture of the relative importance of various incentive factors for Indian workers and the problem calls for more systematic and planned investigation on a more representative national sample. Experimental approach to the problem both in the laboratory and in the field situation is also likely to yield useful data on incentives and their efficacy for Indian workers.

Job attitude has been a favourite area of work. The investigations in this sub-field have dealt with diverse topics; adolescents' attitude to work (Yoganarasimiah, 1957), employee attitude of refugee workers (Bali, 1967); attitudes of women workers (Ganguly, 1955); attitude towards management (Ganguly, 1953); college teachers attitudes towards authorities (Banerji and Kumar, 1960), and attitudes of small scale entrepreneurs towards labour unions (Hundal, 1967). Ganguli (1956c) discusses the problem of validity of an attitude scale in industry and some of the variables affecting the attitude of industrial workers. (Ganguli, 1954a, 1954c). Prakash (1969) makes a comparative analysis of opinions of management personnel in public and private sector industries on some topical issues. Singh and Wherry (1963) make a cross-cultural comparison of American and Indian workers, and Lahiri and Chowdhari (1969) analyse the influence of unions on the perceived importance of job factors.

A number of researches have been initiated on attitude and morale of industrial personnel by the Industrial Psychology Division of the Central Labour Institute. Analysing the attitude and morals of a large chemical processes undertaking, Jones, Ganguly and Sequeira (1964) found the older unit to be lower on the level of satisfaction with regard to various factors of the work situation. Maule and Ganguly (1964) analysed the attitudes of officers towards change in the management practices, especially with regard to democratisation.

Though it is difficult to establish a causal relationship between attitude and efficiency, some light on it has been thrown by Ganguly (1958). Through a kind of action research programme, involving lectures and discussions, he tried to reorient the attitude of foundry workers and compared the post-orientation attitudes towards supervisors, national government and the job with those prevailing before the orientation. The programme produced a marked improvement

in participants' disposition and relationship with various categories of personnel.

Chowdhry (1953) studied the attitude of textile workers and the effect of those attitudes on working efficiency. Ganguly and Kasbekar (1969) analysed the attitude and morale and their relationship with the conditions prevailing in different divisions of the plant. In another study (1968b) they have observed cultural and geographical homogeneity, non-attachment from agricultural community, living in small township and lack of awareness regarding industrial development to be associated with favourable attitude. The importance of socio-cultural factors in determining workers attitude has been emphasized.

Job satisfaction along with job attitude has been a very fertile area of work, beginning with a study by Sinha (1958). Isolating the factors underlying satisfaction and dissatisfaction in office and manual workers, a large volume of work has accumulated. Sinha and Singh (1961) and Sinha (1965) established relationship between job satisfaction and absenteeism. In other studies, Sinha and his co-worker (Sinha and Sarma, 1962) observed negative association between union attitude and job satisfaction and positive relationship between job satisfaction and general adjustment (Singh and Agrawala, 1969). Relationship of job satisfaction with different background factors has been analysed (Sinha and Nair, 1965) and its relation with worker behaviour has been investigated.

Nataraj and Hafeez (1965) ascertained the influence of age, education and salary. Prasad (1965) and Guha (1965) have focused on personality and personal factors and Pestonjee (1967) on some organizational variables. Ghosh and Shukla (1967) found job satisfaction to be more a function of job condition than of personal factors. While talking about morale Ganguli (1957b) has actually conducted a job satisfaction study with the help of a multi-dimensional questionnaire and found satisfaction with total organization and benefits derived from it as one of the three important components of morale. Analysing the existing data available on job satisfaction, he (Ganguli, 1964) has tried to answer the questions about the percentage of Indian industrial workers who can be regarded as satisfied with their job. The satisfaction figures are low compared with those reported by the investigators in the west. He (Ganguli, 1954c) has also studied the effect of union membership on job satisfaction. In his interesting investigation into the satisfaction and discontent of employees, Veeraraghavan (1960) observed interesting differences in the attitude of transport workers belonging to public and private sectors. In general, the private sector workers displayed greater satisfaction and were more favourably disposed to-

wards management. In another study (ATIRA, 1964), the level of job satisfaction in high productivity units was found to be significantly higher than in low productivity units. Their employees viewed various aspects of their job more favourably. Dissatisfaction with certain aspects of work tended to spread to other areas. Studies on job satisfaction have revealed its importance and its causative factors. The picture, however, is not clear regarding the importance of causative influence. Such studies and those conducted on the perceived importance of job attitudes (Lahiri, 1963; Lahiri and Chowdhuri, 1966, 1969) have not yielded a very unified picture of the determinants of job satisfaction. Before a clear picture emerges, we need further investigations on the relative importance of the causative factors and the nature of its relation to different facets of worker's behaviour. While personnel and personality factors have received greater attention, the situational variables in job satisfaction have not been carefully investigated.

Morale has also received some attention from the investigators, though the term has often been used in a rather loose sense and quite frequently it has been confused with job attitudes and job satisfaction. Sharma (1958) analysed the psychological mechanism of industrial morale and Gangrade (1956) concluded that morale cannot be built up just by higher wages. Singh, Wherry and Hunter (1963) made a methodological comparison of two types of morale measures, and using factor analysis, extracted a number of factors, namely, pride in group and status, fellow workers vs. foremen-centredness, belief in the considerateness of the foremen, pride in one's contribution and its recognition, pride in growth and advancement, satisfaction with security and steady work. Ganguly (1957b) has isolated a number of morale factors of which job satisfaction is one. In an action research study, Ganguly (1958) observed the usefulness of group participation in improving industrial morale. Desai (1964) compared two industrial organizations on the morale factors, while Chatterji (1961) studied morale and team-work with respect to productivity.

A number of good reviews on factors influencing industrial efficiency are available, viz., the review by Das (1967) entitled 'Prediction of Individual Performance in Production and Management' in a book entitled *Behavioural Sciences in Management* and Ganguly's (1962) article on 'Factors Influencing Worker's Efficiency in Industry' in *Papers on Industrial Psychology*. Sinha and Sawhney (1968) analysed the factors regarding productivity trends. Jambunathan (1959) proposes an industrial productivity measurement, and Deb (1967) investigated the differential effect on physical work in group and in isolation. Roy (1958) and Mukherjee and Sreekumar

(1960) studied production efficiency in terms of certain personality characteristics and inter-individual variability.

There have been some studies on industrial tension. Divatgarkar (1955) outlines various factors underlying employer-employee tension in two big industries in Calcutta. A selected group of workers were placed under training on effective communication and checking the spread of baseless rumours and misunderstandings. Group discussions with supervisors and foremen were arranged. The beneficial effect of the procedure on improving the tension level was observed. Ganguly (1958) studied industrial tension through attitude survey. Comparing mills in high and low tension on the basis of reported grievances, Chowdhry (1955) found the latter to have lower absenteeism and labour turnover, and hence efficiency rating. Apart from these sporadic studies, no systematic work on tension is available.

The problems of grievances and strikes are obviously significant and are assuming very serious dimensions in India. The ISTRA group (1964) studied factors contributing to indiscipline and its effects on certain industries in Coimbatore. Venugopalan and Nallaswan (1960) analysed 134 industrial disputes and determined their underlying causes. Chakraborty (1960), in his book entitled *Strikes and Morale in Industry*, makes an elaborate analysis of the frequency, magnitude and duration of strikes and analyses some of the causative factors in the industrial belts of Maharashtra and Bengal. His study covers a very wide area and yields valuable information on job attitudes, job satisfaction and morale and brings out interesting regional differences. In Dhyani's (1963) article, various types of strikes are analysed and some suggestions for meeting the situations have been given. Murthy (1955) makes a statistical analysis of industrial disputes in India during 1937-45, and Soni (1956) notes the influence of seasonality of the incidence of strikes in Bombay textile industries. One study on grievance procedure has been reported by Nallaswan (1962). The only study on *gheraos* is by De and Srivastava (1967) which analyses in general terms the frequency and coverage of *gheraos* in West Bengal and suggests general measures for countering the phenomenon.

The field of labour union, discipline, industrial tensions, grievances, disputes and strikes as well as gheraos are of vital significance. Psychological investigations on these problems have been very few and they provide a fertile field for every Indian psychologist to reap a rich harvest by properly designed study and use of adequate survey techniques.

The country is passing through a phase of accelerated industrialization. Persons with deep roots in rural areas are fast migrating to overcrowded industrial cities. Such uprooting of the rural popu-

lation is likely to have its repercussions on the general behaviour, adjustment and mental health of workers. UNESCO has been interested in the field and a number of studies have been sponsored. Bhattacharya (1961) studied individual difference in susceptibility to industrial monotony while Singh and Singh (1967) analysed the job background factors in such a susceptibility. A few studies relate to employee adjustment within and outside work-situation influencing adjustment. Ganguli (1964) has given certain figures of the incidence of neuroticism on a small sample of workers. As far as the scores can be relied upon, 12 per cent of the industrial workers and 13 per cent of the industrial managers as compared to about 15 per cent of the students could be regarded as suffering from some sort of neurosis. The value is comparable to 10 per cent incidence reported amongst war-time workers in England by Fraser (1947). Yoganarasimiah (1962) conducted a mental health survey in various units in Bangalore. Prevalance of different types of mental health disorders was determined and background information regarding the reported cases was obtained. More recently, Ganguli (1967, 1968a, 1968b, 1968c) has made a comprehensive study of the prevalence of psychological disorders in Indian population and has compared the same with the incidence of such disorders in other countries. Though automation is not yet a problem in Indian industry, Ganguli (1958) has analysed the question of mental health of automated and non-automated workers with reference to accelerated industrialization. A good review on occupational health research in India is also available (Ganguly, 1962). Veeraraghavan (1964, 1966) has analysed the personality and socio-cultural changes and adjustment to urban environment of migrated rural workers in industry.

The field of worker adjustment and mental health is an important one, especially in view of the fact that a large proportion of workers still hail from rural areas and are not fully "committeed" to industrial life. The question of their adjustment and mental health as well as the impact of the same on worker efficiency and interrelationship in the factory are problems which require further investigation.

Absenteeism has always been one of the persistent problems in industry. Compared to the incidence in western countries, the rate in Indian industries has been considerably higher. The number of studies conducted in the field is indicative of the importance of the problem for the working life in India. The earlier studies of Rao (1950) and Murthy (1953) have been surveys analysing various personal and social factors behind it. Bai (1956) makes a special study of absenteeism among women workers, and Bhattacharya (1952),

and Rizvi and Rao (1952) have dealt with sickness absentees. Some good statistical analyses of absenteeism in Indian industries are also available (Som, 1953; Venkataraman, 1964). In Sinha's researches, neuroticism and some personal factors behind absenteeism (Sinha, 1956b) have been investigated and a close relationship of job satisfaction and absenteeism has been observed (Sinha and Singh, 1961; Sinha, 1965). Sinha has also analysed the causes of absenteeism and suggested measures for controlling it (Sinha, 1961). The study of Krishnamurthy (1965) supports the association between absenteeism and job satisfaction observed in other studies.

The general pattern of investigation on absenteeism followed by Sinha has been adopted by many researchers who have tried to unravel the factors influencing its incidence (Chakrapani, 1968). Rudraswamy (1958) makes an effort to analyse some of the traits of absentee-prone workers. In another study, he (Rudraswamy, 1969) points out how the rate of absence was reduced from 26.2 per cent to 14.2 per cent as a result of six-months' programmes of counselling. Vaid (1967) studied the absentees in relation to work behaviour and work attitude and also chronic absentee worker. Desai (1966a) deals with the general problems of absenteeism in industry and regards it as a problem of discipline. In a recent study Sharma (1970) reviewed the studies on absenteeism and made a search for its correlates. A number of demographic, social and organizational factors were examined in relation to absenteeism. The findings indicated that except for rural-urban background and union involvement, most of the selected variables failed to show significant association with absenteeism. The findings were in direct opposition to what is generally found in the researches on the subject.

Studies on labour turnover have not been many, though in certain industries like coal mines, plantations and on certain grades of staff, the problems have been acute in India. Only one study has been reported, viz., the study of Naidu (1963) conducted over a three-year period, on permanent employees in 45 textile mills around Coimbatore. Inter-Industry variation was high. The incidence of turnover was negligible in small units with fewer supervisory staff. It was found to be high among those who had technical qualifications, and was greater in the lower age group. Labour turnover was associated with various organizational and individual factors.

The problem of labour turnover has remained largely neglected. It has many interesting factors in the cultural and social milieu of the Indian workers. Studies focusing on the organizational, individual and socio-cultural variables are likely to be fruitful.

VI. Management and Organization

Management and organization is the second favourite field of research and studies in the field constitute about a fourth of all the researches reviewed. In a UNESCO report (1961), socio-cultural factors affecting productivity of industrial workers have been investigated. Adjustment to factory life showed the highest positive relation with productivity. Workers from U.P. were found better adjusted to factory life than their counterparts from Bengal and Maharashtra. Positive attitude towards management showed a tendency to correspond with high productivity. Influence of family on the individual had a negative relationship. Hundal and Chandra (1968) studied direct social change in relation to social status of industrial workers. Chowdhry (1960a) analysed the human factors in resistance to organizational and technological change. Maule and Ganguly (1964) determined the attitude of officers towards changes in management practices in a textile factory. The changing pattern of industrial workers in India has been studied by Pande (1968b) on white-collar employees, and by Sharma and Guha (1967b), on industrial workers.

Intra-organizational problems affecting employer-employee relationship have also received considerable attention (Prakash and Chatterjee, 1960; Chatterjee, 1951). Devasagayan (1949, 1951) discusses the general problem of employer-employee partnership. The SITRA study (1961) describes the human relations in industries of varying sizes.

Studies by the Michigan University group on the importance of the pattern of supervision to productivity and morale have stimulated a lot of work in India. By and large, these researches have been largely replicative as far as the method and techniques employed are concerned. The results are useful in so far as they have generally corroborated the findings reached in the west and also point to a number of interesting differences. The earliest study has been that of Bose (1955) who has stressed the importance of supervision on productivity in an aircraft factory. He observed two essential pre-requisites of happy industrial relations, viz., mutual understanding between the workers and employers and true leadership on the part of the latter. He (1955) observed no difference in intrinsic job satisfaction scores between the workers rated efficient and less efficient. Employee-centred supervision was positively related to morale and pride of workers in their work groups. High pride showed positive relationship with productivity. In a later investigation, Bose (1958a) studied the effect of group cohesiveness on worker morale and efficiency, and concluded that "employee-cen-

tred" supervision was conducive to both these factors. In another paper (Bose, 1957b) he stressed the factor of effective leadership and participation of workers in management, and the use of participation as a technique of leadership. Bose (1958c), in his paper on 'Psychological Approach to Productivity Movement', found that most of the employee-oriented supervisors belonged to the high producing group while the work-oriented supervisors belonged to the low producing group. Group cohesiveness was positively related to morale and productivity. Introduction of technical changes through workers participation in the form of discussion facilitated higher production on the implementation of the change. A group which did not participate in such a process showed a slight increase initially but the production came down very soon.

Chowdhry's study (1953) on differences in worker behaviour associated with low and high tension mills has yielded interesting results regarding the nature of supervisory role. The low tension mills had supervisors of the "understanding" type who tended to take work through persuasion and felt that workers understand better when addressed in a "sweet tongue". The supervisor of the high tension mills used fear to motivate the workers and often observed that he had to give suspension notices in order to warn others to be careful.

Ganguli has made elaborate studies on the pattern of effective supervision and has brought out a number of papers and monographs (Ganguli, 1957a, 1957b, 1961a; Ganguli, Goswami and Ghosh, 1957). Employee-centred supervision seemed to go with worker satisfaction, morale and higher productivity. Sequeira (1962a and 1962b) who worked with Ganguli, has outlined the characteristics of the effective supervision. As he himself summarises: "The conclusion regarding effective supervisory practices is less ambiguous and less relative. The main criterion seems to be the level of the supervisor in the hierarchy. At the first line level, factors like supply of tools, material, training of men, etc. are important. At the higher levels, general supervision is more important. The less concrete points relating to attitudes and loyalties of supervisors are more elusive and subject to controversies." Bhatt and Pathak (1962) found high intelligence and dependability as important perceived characteristics of effective supervisors. Chatterjee (1961) obtained high positive correlation between democratic leadership and productivity. Yoga (1964), after studying the first line supervisors in a number of engineering and textile industries found that a large number of supervisory functions were common to different types of industry. But the authority pattern in engineering, textile and processing industries showed significant differences. In general, supervisors had a minor

role with regard to costs and recruitment functions. Amin (1963) reports on the behaviour and traits of jobbers who were liked by the workers. Qualities perceived in successful jobbers were high technical knowledge and ability to coordinate supply of materials, good behaviour, politeness and straightforward and persuasive approach. They were not expected to pass on duties to workers under them but were expected to give freedom to workers in their own work. Chatterjee and James (1965) and James and Kanungo (1968) have also described some traits of effective supervisors. Gopalkrishna and Hafeez (1964) analysed supervisory attitude towards employees and production in relation to some personal factors. Sharma (1959) reviewed the existing literature on industrial supervision with regard to its effectiveness and dimensions. The area has been extremely popular and similar studies have been reported by the Central Labour Institute (Ganguly, 1967; Ganguly and Joseph, 1969).

Other aspects of leadership behaviour in industry have also been studied. Chowdhry, Valunkar and Gidwani (1956) studied the differentials in leadership behaviour in elected and non-elected workers' groups. Rudraswamy (1964) investigated the relationship between perceptions of status and leadership attempts. In a number of studies, Chowdhury (1964a, 1964b, 1965b) discussed the need for a management development programme for various levels. In a recent paper (Chowdhry, 1969), she has analysed the generational conflict in management.

Entrepreneurs, industrial or agricultural, have not received much attention from the industrial psychologists. The importance of generating achievement motivation in entrepreneurs through psychological inputs and its salutary effects on increasing economic achievement have been demonstrated by McClelland and Winter (1969) on the entrepreneurs of Kakinada. It is a study which should stimulate further work on the training of entrepreneurs and management and its impact on productivity. Hundal (1969) has analysed the achievement motivation of fast and slow progressing industrial entrepreneurs, while Gaikwad (1969) investigated the socio-psychological factors influencing industrial entrepreneurs in rural areas. Another area which has stimulated Indian psychologists is organizational factors in productivity. The concept of measurement of organizational control first popularised by Tannenbaum in the United States has gained considerable popularity. In his monograph on *Structure and Process of Organization,* Ganguli (1964) has conceptualised and classified organizational control into three types, viz., policy-making, execution of policy and distribution of rewards and punishment. He grouped the activities of organizations into

such systems as work assignment, transfer and grievance, and so on. Assuming the amount of exercised control to be finite, he measures it with the help of the Likert technique on three cadres of employees. His results suggest that the total amount of control exercised by different positions is similar. Policy is made in a centralised manner and by fewer individuals but the execution of these policies is spread over different individuals. There is no difference in the total amount of desired and existing controls in any field. Some alterations in favour of juniors in the control exercised by different positions is desired. The preferred amount of control for policy matters on the one hand and execution and reward control on the other is different. The result is interesting and calls for further studies in the direction.

Investigations made in the post-Hawthorne era have treated the industrial organization as a separate social system and have emphasized the interdependence of technical and human aspects of the organization. A more global approach to the understanding of industrial behaviour is perceptible. In India, the pioneering work in this area was done by Rice (1953, 1955). He made an analysis of the socio-technical system of an experimental automatic loomshed. His second study is a follow-up of the same. Recently, Roy (1969) has made a re-examination of Rice's methodology. Chowdhry and Pal (1957) studied the interaction of production, planning and management practices and their effects on the morale of the supervisory staff of two textile mills. They determined the way this policy was reflected in the organizational structure and in the management practices prevailing in the mills and examined their effects on the satisfaction of the members and the efficiency of each organization. The results indicated the inter-dependence of the technical and human aspects of organizational structure. Singh and Rudraswamy (1959) investigated organization and communication in twelve mills in Coimbatore in order to study the hierarchy of management, span of control and the effective means of delegation and coordination. The analysis revealed some hazards that hindered the operative efficiency. Three standard organizational charts for small, average and big size mills have been suggested. Chowdhury (1959) analysed the human and organizational problems of an expanding organization. Pestonjee (1967) has studied the employees morale and job satisfaction in relation to organizational structures. Using Nelson's classification of organizational climates, Akhtar and Pestonjee (1967) assessed the effectiveness of regimentational, bureaucratic and democratic types of organizational structure in terms of job adjustment and satisfaction. Ganguli's (1964) extensive investigation of organizational structure and process in a government

engineering factory has thrown light on the problems of leadership behaviour in formal groups, organizational control, job satisfaction, and worker adjustment. Some extremely interesting findings, indicating the differences from the western studies, have been reported. Among other things, the influence of organizational climate on productivity and employee satisfaction has been determined. High producing shops were perceived to be somewhat more bureaucratic and less autocratic than the low producing shops. Though democratic pattern was more associated with worker satisfaction, it was not always the case with higher productivity. Studies of this nature reveal that the results obtained in the west are not totally applicable to Indian conditions and call for more elaborate and thorough investigation into the organizational problems in the Indian setting.

Unlike in the west, the area of decision-making in organizations has remained neglected. The only research of some consequence is by Daftuar (1967) who has studied the problem of task-structure and centrality in a management decision-making game. Similar studies are likely to become popular in years to come.

Investigations on organizational structure and development have been made by Dayal (1963, 1967). The role of behavioural science consultants in organizational development has been described, and the underlying factors in it have been outlined (Dayal and Thomas, 1968). In a number of articles, Chowdhury (1969a, 1969b, 1969c) has analysed the organizational structure and problems in different types of organizations like scientific institutes, universities and industries.

Psychologists have not attended very much to the special problems that emanate from differences in structures of the private and public sector undertakings. Veeraraghavan (1960) has studied the attitude differences. In his Project report on "Some Problems of Public Sector Organization", Sinha (1969) deals with differential distribution between two public and two private sector undertakings on factors like types of executives and their background, need structure, perception of organizational norms and objectives, interference by government, leadership, organizational activities, job satisfaction, and perceived efficiency. Analysis of the psychological characteristics of private and public sectors is a fertile field and deserves greater attention from psychologists.

Communication is essential for the maintenance of good labour-management relations. In his paper to the Madras Psychological Society, Pal (1962) discusses the importance of industrial communication and refers to some researches. Desai (1966, 1969b) stressed its importance for the management. Hafeez (1965) points to the psychological aspects of the industrial communication. Others have also stressed the importance of industrial cooperation and

communication (Ganguli, 1955b; Bhatt, 1962; ATIRA, 1961). Experimental studies in this field are lacking. The only two empirical studies dealing with experimental analysis of factors in communication have been reviewed here. Chatterjee (1965) studied the time phase sequence in the pattern of communication in small groups. He aimed at testing two hypotheses about the relationship between time and interpersonal interaction in a group. Shintra (1967) determined the main sources of information among workers of a pharmaceutical concern in Bombay and concluded that informal or 'grapevine' channels of communication were prevalent to a great extent. Majority of the respondents were not aware in advance about changes affecting them. The need for improving communication was stressed.

The area of communication is important; and the sources and channels of information and methods of improving communication require greater attention.

Labour unions in India are not strong, and multiple unions complicate and disturb the Indian labour scene. A few studies in this field have been made and they focus attention on the impact of union membership on workers' attitude (Ganguli, 1954a, 1954b, 1954c, 1956a) and on psychological analysis of motives underlying unionisation (Sinha and Pal, 1963; Vaid, 1968). Sinha and Sarma (1962) have found favourable attitude towards unions associated with low job satisfaction. Sinha (1960) compared the morale of the members of rightists and leftists trade unions and found the former to have comparatively better morale. Motivational analysis of union membership and perception of union functions (Sinha and Pal, 1963) revealed a general agreement between workers and supervisors. Representation of grievances, security, economic motives and protection in times of trouble were the most frequently mentioned reasons for joining the union. By and large, the 'watchdog' function of a labour union is assumed to be the most important in the eyes of the workers. An average worker did not appear to be motivated by such things as desire to participate in and cooperate with the management, nor very much with the working conditions or the political aspirations. Representation of grievances, economic motives and security needs pre-dominated. Vaid (1965a) has prepared a monograph on trade unions in India which contains valuable psychological information on the motivational side of trade unionism. Nanda (1969) studied the union responses to a crisis, and Bogeart (1968) and Baviskar (1968) have concerned themselves with the dynamics of political unionism and union and management politics respectively. Rival unionism and ideological conflicts in trade union movements have been dealt in two papers by Pandey (1967, 1968a).

Sheth (1969) sought to measure the extent of workers' participation in union activities. Trade union leadership has also received some attention. Sheth and Jain (1968a, 1968b) made a study of the status and role of local union leaders, and also of leaders and politics. Tripathi (1967) presents a case study of trade union leadership. Competitive unionism has been studied by Thakur (1968) and the effect of multiple unions on human relations by Sreenivasan (1959). Causes underlying the incidence of multiple unions and their effect on workers and industry have been investigated.

The field of labour union has mostly been studied by labour economists and experts on labour relations. Psychological dimensions of union leadership, motivational factors, and impact of unionization and union conflict on worker behaviour and attitude are problems worth investigating in a more systematic way.

In the field of management and organization, some good general papers are available. Rao (1948) discusses the personnel problems in industry. In his paper to the Madras Psychological Society, Sinha (1962) deals with group relations and Ramachandran (1962), with the question of public relations in industry. Sinha (1960a) has analysed the social and behavioural problems in industry, referring to the results of relevant researches in India and the west. Frustration in industrial work has been analysed with respect to its causes and manifestations by Sinha (1962). Sheth (1960) discusses the social framework of Indian factories and in a more recent paper (Sheth, 1968), he also deals with computer and industrial relations.

The problems of management and organization have generated many psychological researches. The interest of investigators has been widely diffused. Compared to other areas, the proportion of general papers produced on the subject is much greater than that of empirical studies. The field has only recently come under the research focus of psychologists. Management and organization have many psychological dimensions. The pattern of industrial development and socio-cultural factors which are peculiar to this country require careful analysis in the context of management and organizational behaviour.

VII. Special Environment

India being a country with great differences in climatic conditions and temperature, one would have expected considerable amount of work on the influence of environmental factors on work efficiency. Only 27 studies in the field were reported and most of them are conducted at the Central Labour Institute and at ATIRA.

Chatterjee (1964) made a physiological analysis, specially related to the heart-rate responses of workers under different environmental conditions while wearing a variety of industrial protective face-masks. In another study, (C.L.I. 1965), the effect of environmental conditions on health of workers engaged in the manufacture of D.D.T. was studied. Sabris and Banerjee (1956) surveyed the environmental conditions in foundaries in relation to the health of the workers.

A number of investigations on thermal stress work-load and physiological stress have been reported (C.L.I., 1953; ATIRA, 1957; Saha, Sen Gupta and Rao, 1962; Chatterji, Sen, Saha and Subramaniam, 1964; and Sen, Saha, and Subramaniam, 1964). Noise which is a common phenomenon in industry has received due attention. Chaubey (1949) inquired into the subjective effects of using ear-plugs by workers and supervisors in noisy places. The problem of noise has been elaborately investigated (Ganguli, 1950; Ganguli and Rao, 1952; Rao and Ganguli, 1954). Ganguli (1954e) studied the efficiency of eight weavers in a jute mill under two conditions of noise—the normal high noise of 100 db and reduced noise level of about 80 db. There was a general increase in production with noise abatement. The results were generally in line with those from similar investigations in the west.

The Central Labour Institute (1965) reports a detailed study on the problem of noise in relation to occupational hearing impairment. More recently, Kumar and Mathur have analysed the relationship of noise distractibility, the nature of task, sex, and neuroticism (Kumar and Mathur, 1968, 1969a, 1969b).

Music is supposed to create a wholesome effect on the minds of its listeners. The studies made in the west have pointed out its beneficial effect, directly or indirectly, on production. Mishra's (1949) study is of a theoretical character. Daboo (1961) reports a study conducted at the TISCO plant where music as well as news relay of important events were provided to the employees using the company canteen. Reactions of the employees showed that music had a cheering effect on their minds and enabled them to return to their shop floors in a happy state.

Mukhopadhyaya (1948) studied the hours and conditions of work in tea plantations. No study directly bearing on varying conditions of work in plantations or other industries and their impact on workers' productivity and behaviour seems to have been made.

Das and Bhattacharya (1964) investigated the effect of simulated under-water conditions on performance on some psychophysical tests. The difference in performance under the conditions of under-water stress and normal conditions was not statistically significant, though

the average performance scores under stress were generally lower. The maximum deterioration in performance was noticed on the coordination test.

Lighting inside the plants is one of the most important factors in work efficiency, especially because eyes are the most commonly used human sense. The problem has been investigated by I.C.M.R., Office of Chief Adviser of Factories, and ATIRA. Ramanathan, Mukherji and Gurthy (1955) conducted a detailed study in 12 organizations belonging to six types of factories in Calcutta during day and night shifts. Barring a few exceptions, the level of illumination (artificial, natural, or both) prevailing in the factories was subnormal.

Chowdhry and Amin (1952b) investigated into the effects of increased illumination on production and damage in loom sheds. Both tungsten and fluorescent illuminations were tried out. It was found that there was considerable improvement, both in quality and quantity, of production at 15 to 20 foot candles over the existing illumination level of 4 to 6 foot candles. The superiority of fluorescent over tungsten illumination, both with regard to overall production and amount of damage, was also observed.

Temperature and humidity are the two important factors determining efficiency and fatigue amongst workers. Due to large variations in these in different parts of India and the prevalence of high temperature during some parts of the year in many regions, the problem of thermal environment and climate has naturally received some attention. Apart from the moisture need of some industrial processes, climatic variations are considerable and Calcutta has been particularly found to be hot and humid. Rao (1947) analysed some of the physiological problems in tropical life and also conducted an experimental study (Rao, 1952) on the "comfort zone" in tropical Calcutta. The optimum level was observed to be 78.5° dry bulb and 72.5° effective temperature. Since the climatic conditions in Delhi are different, summer being very dry and hot and winter being much colder than what is experienced in Calcutta, Mookherjee and Sharma (1953) found that, for sedentary work, the corresponding comfort range in Delhi was 70° F to 80° F in summer and 60° F to 68° F during winter.

Investigations have also been carried out on the heat load on Indian workers and on the problems connected with radiation and heat stagnation in jute and cotton industries. Amin, Lundgren and Rao (1954) have studied the physiological adaptation of cotton weavers in summer and winter. A comprehensive and elaborate investigation on the thermal stress in the textile industries in Ahmedabad has been conducted by the Ministry of Labour and

Employment (Chief Adviser of Factories, 1957). Upper tolerance limits of textile workers were determined and it was found that 115° F dry bulb with 36 per cent relative humidity and 96° F wet bulb with 88 per cent relative humidity were the maximum tolerance limits and there was a breakdown beyond these points.

VIII. Advertising and Consumer Psychology

Advertisements and analysis of consumer behaviour are indispensible adjuncts of modern business. They help to bring the products effectively to the notice of the possible buyers and thereby increase the sales. Moreover, the analysis of consumer preferences and behaviour also helps the industrialists to gear their production policies to suit the needs of the market.

Only four studies have been recorded in this field. Swamy (1962) presented a general paper to a conference of psychologists in Madras on consumer research and advertising. Bhagwatwar (1969) has studied the impact of Vividh Bharati radio advertisements on consumers. His findings were rather surprising. Most of the respondents were adverse to advertisement on the radio. Even those who were inclined towards it did not show any signs of change in their attitude towards the advertised products. Chakrapani and Gupta (1968) analysed the perception and recall of advertisements in relation to their position. It was found that advertisements appearing in the first and the last page of the front advertisement pages had greater recall value, compared to the advertisements appearing in the middle pages. To investigate the differential characteristics of advertisements, Singh and Huang (1962) made a comparative study of socio-cultural and psychological determinants of advertisements in India and U.S.A. Issues of *Life* and *Illustrated Weekly of India* were evaluated. It was found that American publications used more illustrations, more colour, more pressing appeals and more isolation. The Indian advertisements were typically in black and white. They were crowded and verbal in appeal.

Apart from these stray studies, no extensive analysis of advertisement appeals, consumer behaviour or salesmanship has been made.

IX. Engineering Psychology: Display and Control

Human engineering constitutes a broad field and its findings are of great significance to individual efficiency and adjustment to work. Machines have to be designed keeping in view the capabilities and limitations of human operators. Scientists have endeavoured to match human beings with modern machines so that their combined output will be comfortable, safe and efficient.

This is a comparatively new area of study, especially in this country, and the work is mostly being conducted by the Defence Science Organization. Most of it is "Classified" and not easily available to the average research worker. In his article 'Designing Machines and Physical Hazards' Parthasarthi (1962) has stressed the importance of this area. A few investigations reported in various journals have stressed the factor of proper designing of display, especially for efficient and safe performance of aircraft pilots. Adiseshiah (1956b, 1957, 1958) experimented on speed in decision making under single channel display conditions. In a number of studies, Adiseshiah (1956a), Adiseshiah and Prakash Rao (1956, 1957a, 1957b) analysed the effects of changes in the shape of pointers on speed and accuracy in reading altimeters. Adiseshiah (1965) also studied the effects of speed and load on psychomotor performance of signal operators, while Ganguli (1960) determined the stimulus-response compatibility and stress effect in one dimensional tracking task.

The question of legibility of display has received some attention. Das (1965) reports the study made by Bhagoliwal into the typographical dimension effecting the Hindi prints. Variables of type size, lines and space between the lines were taken into consideration. Increase in the space did not increase the legibility of prints. Greater legibility was found when the type was set solid or with single space between lines. The optimum legibility for different types of size was determined. Studies of this character have not been many in this country. But the few that have been conducted indicate the lines on which investigators may pursue their interest.

Areas other than display and control have also been studied. Ramanathan and Datta (1968) investigated the effect of architectural design of staircases on persons ascending the stairs with a load. Chatterjee and Daftuar (1966) conducted some very interesting studies on the layout of work space on human scale proportions in optimising systems and machine designs (1969) and determining eye-hand reach angle in relation to different body dimensions in typewriting (1966). His work stems from Le Corbusier's hypothesis of human scale based on human body dimensions, and his claim that it is the most scientific and natural tool for man-environment compatibility. In his general paper (Daftuar, 1969a), he has attempted to draw our attention to a new and potent area of study within the spectrum of engineering psychology. He discusses the psychophysical problems that may be of concern to all those who are involved in design and utilisation of buildings, and hints at a new field called 'architectural psychology'. In another paper, Daftuar (1969b) discusses the problem of optimising system and machine design following the human scale of proportion.

X. Driving and Safety

With increasing industrialization, the number of workers involved in industrial and transport accidents is rising in this country at a steady rate. With the realization of the vital role which the human factor plays in accident causation, psychologists have shown considerable interest in this problem and have produced a fairly large amount of both theoretical and empirical studies. Pal (1949) has discussed the prediction of accident proneness with the help of psychological tests, and Chatterjee (1953) has analysed the causative factors in street accident. Kalia (1953) has stressed the human factor. Sabris and Rao (1961) have analysed the trend of accidents in Indian industry and discussed preventive measures. Some other general studies on accident proneness (Chatterjee and Mukherjee, 1968), accident prevention (Desai, 1968c) and problems of health and safety in textile industry (Paramanayakam, 1965; Mitra and Banerji, 1962) may be mentioned.

A few good empirical studies have been reported. Bose (1952b) observed that scores on a battery of psychological tests which were useful in predicting job proficiency also correlated with accident record. Due to low size of coefficients, tests could not be considered as an adequate measure of accident proneness. Srivastava (1954) analysed the socio-psychological factors in accident causation and determined the characteristics of accident-prone workers. Banerjee (1956) studying reaction time and concrete intelligence in relation to accidents found a negative but significant correlation of —.54 between accident and reaction time while intelligence did not seem to be related to accident. Kundu (1958), using the word association technique, tried to locate the inner emotional complexes underlying industrial accidents. Though differences in response time and response words were not statistically significant, they were large enough to locate the emotional complexes responsible for accidents. Dey (1961) analysed accident proneness in jute industry and Banerjee and Ghosh (1969) in automobile industry. Ghosh and Tripathi (1965) examined Drake's hypothesis on discrepancy between perceptual and motor speed levels as the key to accident proneness and did not get support for it. In his article in *Productivity* Menon (1968) made a review of causative factors in accident proneness, and observed that visual skill was not related to workers' susceptibility to accident. Personal safety was dependent upon the interaction of temperamental characteristics and job situation. Family, emotional, social, mood and reality adjustment were not related to accidents, while job satisfaction was found to be related. Prasad and Jha (1968) analysed anxiety, wages, and length of service in relation to accidents and

found insignificant relation with these factors. Bose and Dasgupta (1969) have analysed the attitudes of multi-accident omnibus drivers. In another study, Menon (1969) observed that visual acuity, depth perception and some sensori-motor coordination tests tended to differentiate the accident-prone and accident-free groups, while, except on word adjustment, personality tests did not seem to be a factor. The results obviously conflicted with his earlier findings.

Daboo (1961) reports on the appraisal of safety training programme in TISCO as assessed through the reactions of participants in it. Extensive studies on accidents have been conducted at the Central Labour Institute, Bombay (Ganguly and Kasbekar, 1968a; Gupta and Gulati, 1968a, 1968b). Accidents in Bombay transport were studied in relation to routes, days in the week, persons involved, experience, previous employment and a host of other factors. Correlation between collisions, and fatal and injury accidents, though positive, was low ($r = .46$) between accidents in two successive years. Out of 92 drivers who had each 6-8 accidents in a year, 25 drivers had met practically with no accidents in the subsequent years. Only partial support for the concept of accident proneness was obtained and modification in the concept was suggested. In another analysis, attitude of drivers was found to be a contributory factor. The attitude of accident repeaters was unfavourable towards areas, transport officers, fitters and medical facilities. The study stresses accident prevention measures both on the personal, attitudinal planes and the need for counselling. The study of Gupta and Gulati (1968a, 1968b) relates to accident and safety measures in light and medium engineering factories and in transport equipment industry. The report suggests preventive measures.

XI. Surveys and General Articles

Some fifteen surveys and thirty-three general articles were reviewed. Surveys have dealt with health among sweepers and scavengers (Chatterjee, 1958); workers' indebtedness. (Desai, 1969c); special problem of night-shift workers (Sitaram, 1962); and institution of serf labour among the aboriginals (Sivaswamy, 1948). Rao and Ganguli (1951) surveyed the incidence of venereal diseases among industrial workers. A few good surveys dealing with medico-social problems (Rao and Ganguli, 1950; Ganguli, 1951) and attitudes of women workers in jute industries (Ganguly, 1955) are also available. Talpallikar (1948) analysed the life and labour of women workers in Bellampalli mines. These surveys are interesting for providing psychological information. An extensive and useful survey has been done by Lambert (1963) on *Workers, Factories and Social Change in*

India, published by the Gokhale Institute of Politics and Economics, Poona. Studying the workers in the five privately owned factories, it considers the demographic characteristics—sex, education, literacy, caste, family and migration history—both in comparison to local non-factory populations and in relation to each worker's position within the factory. It analyses the previous occupational histories of the workers, the means by which they secured their current jobs and their perception of the labour market. The nature of and criteria for hierachical position of each factory, the degree of fitness between wage and skill hierarchies, the history of horizontal and vertical mobility among workers, the aspiration levels of various types of workers, job satisfaction and its relationship to hierachical position is discussed. The survey provides useful information on aspirations, job satisfaction, worker's commitment, caste and status in the factory and on various attitudes of the workers. It reveals that the variable of education appears to be more significant as a determinent than caste in fixing the relative position of the worker in a factory.

Many of the general articles have dealt with social aspects of industrialization (Chowdhry, 1965a,) and different facets of human relations in industry (Desai, 1967; Pandey, 1968b; Ram, 1952). Sharma (1969a) discusses the adaptation to industrialization, and Shanmugam (1948) analyses the problem of labour community development.

A bird's eye view of the situation in industrial psychology in India can be had from the publication of Madras Psychological Society entitled *Papers on Industrial Psychology* (*1962*). Bose (1956, 1958c) and Ganguli (1953) have written general articles outlining the role of industrial psychologists. Sinha (1970) has reviewed the psychological researches in the field of labour upto 1965, and more recently Daftuar (1969c) has reviewed the status of industrial psychology in India. Baumgartel (1966) wrote a special review of Indian personnel psychology.

Summing up

The topical analysis of the studies reviewed here provides a picture of the diversity and emphasis of the researches in the field of industrial psychology in India. All of them have not necessarily been conducted by psychologists. But they have been included here because they deal with factors of psychological interest and can legitimately be brought under the broad area of industrial and organizational psychology. It is true that Indian investigators have covered a large area in most of the subfields. It must be observed, however, that the researches have not always been syste-

matic and of sustained character, using proper techniques of sampling.

The review highlights the subfields in which psychologists have been mainly interested and those which have been ignored. There has been a substantial interest in workers' attitudes, job satisfaction, and supervisory behaviour and practices. This is not unlike the trends observed in researches in industrial psychology in the west since World War II. Perhaps the greater interest in social psychology which the Indian investigators have generally shown and the humanitarian values of Indian socialism underlie this trend. Researches on leadership and supervision in industry and Government organizations have been significant, and the primary question has been whether Indian researches on the pattern of effective supervision and its impact on worker behaviour yield similar or different findings from those obtained elsewhere. While the reports show some conflicting results, there is ample evidence that they generally support the western studies on the behavioural characteristics of effective supervisors.

Work on group and organizational factors has received impetus with the classical study of Dr. Rice in Ahmedabad. With the establishment of the Institutes of Management, this area has come into focus and studies therein have shown remarkable spurt in the last decade. Problems in group efficiency and organizational effectiveness are very important and deserve sustained interest on the part of industrial psychologists in India.

The existence of public and private sector undertakings and differences in their organization provide a fertile area of work for the industrial psychologists. However, the impact of these differentials on workers attitudes and behaviour has received scanty attention.

The review indicates that motivation as such has been a relatively neglected area. Though there have been researches on job factors, job attitudes and incentives, motivation as such has not been much studied in the industrial setting. The new interest in the area shown by the industrial psychologists in the west as well as McClelland's work in India on the generation of achievement motivation are likely to correct this situation.

Development of an indigenous body of researches on occupational preferences and choice has been a healthy sign. The problem is vital in view of the socio-cultural factors and the tradition that seems to operate in this sphere. A small and fruitful beginning has been made in this field and it is hoped that investigators would display more systematic interest in analysing factors underlying occupational choice. UNESCO has stimulated work on social and cultural factors in worker productivity and has emphasized the influence of

"adjustment to factory life" as the major variable. It is often observed that there are socio-cultural stimulants and blocks operating in the area of work and efficiency. Many have felt that socio-economic development hinges to quite a considerable extent on changing and properly using the factors. Greater emphasis on this field would therefore be timely.

Researches on test methodology have consisted mostly of standardization of western tests and development of tests suitable for use on the less sophisticated population in India. Studies on the selection process have generally aimed at the validation of test predictions for occupational success. As Baumgartel (1966) has rightly observed: "In spite of the existence of reasonably good selection research, the concept of measuring individual differences and the systematic use of selection procedures has not advanced across Indian industry as a whole." As a result, the bulk of the studies in this field have been largely academic in orientation. Researches on work study and measurement consist mostly of the application of international research methods. Similarly, researches on accidents, monotony, fatigue and work conditions and human engineering have followed the pattern of researches in the United Kingdom and the United States.

For a variety of social and health reasons, absenteeism is a major problem in Indian industry and much research has been focused on this dependent variable. The findings on the factors underlying the same have been conflicting and it is hoped that a more systematic probe into the phenomenon would provide a better understanding of its causative influences.

The general impression that the reviewer gathers is one of dependence of Indian industrial psychologists on the west with regard to the problems, methods and techniques that have been used. Many of the studies are replicative and repetitive. Very seldom have efforts been made where investigators have shown inventiveness in developing their own techniques to meet the problems which are different in character and not quite amenable to the usual survey techniques. Lambert (1963) has pointed to the "acquiscance effect" and the danger of undue reliance on questionnaires and other verbal techniques in studying the workers in India. Similarly, in measuring attitudes or neuroticism, schedules and questionnaires, largely modelled on those in the west, have been used. But these often have items and contents which carry hardly any sense to the average Indian worker and which deal with topics which are outside their frame of reference. It is, therefore, essential that psychologists in India show a little more consciousness of the special methodological problems that are encountered in the field. Further, investigators have

not generally been sensitive to the unique and special problems which characterise the field of labour and industry in this country. For example, no large scale investigations into labour indiscipline, *gherao,* labour participation in management, problem of organizational leadership and attitudinal differences in the private and public sector undertakings have so far been reported. The question of mental health of workers in the context of accelerated industrialization, urbanization and rapid social change also deserve more thorough investigation.

Another feature which strikes one while reviewing the studies is the academic slant of researches in industrial psychology. This has probably resulted from the lack of contact between the academic psychologists and consumers of their researches in industries and other organizations. It is seldom that a problem is referred by the industry to the researcher for investigation. A psychologist probes into a problem in industry not always because it is of vital importance but because his own reading may have generated interest in it. It is, therefore, not surprising that the orientation of several studies is largely academic. This trend, however, is showing signs of change in recent years. The establishment of different institutes of management, and research organizations like ATIRA (Ahmedabad Textile Industry Research Association), SITRA (South Indian Textile Research Association) and S.R.C. (Shri Ram Centre for Industrial Relations), and bodies like the National Productivity Council, and the gradually increasing contact between the academic psychologists and industry, have provided the necessary corrective. With their intimate contact with industries, these organizations are likely to take up problems which are pressing and display better theoretical as well as practical orientations. Within the last decade the volume of work in this field has shown phenomenal rise. These are encouraging signs. In years to come, not only will the volume of research in the field grow further, but the area as such would display greater diversity, greater theoretical soundness, and increasing practical orientation, gearing researches to the pressing problems of industry which is likely to benefit most through a psychological approach and analysis.

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6

Military Psychology

A Trend Report

By

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Introduction

Research in Military Psychology started rather late in India. In 1943, a small cell was created in the Defence Ministry to devise procedures for selecting officers for Indian Armed Forces. Soon after Independence, this cell wes reorganized in 1949 and designated as the Psychological Research Wing. A few tests developed were successfully employed by different Services Selection Boards set up in the country along the lines followed in the United Kingdom (Lall, 1952, 1955; PRW: 131, 1955). The follow-up results proved extremely encouraging. Wastage in training among cadets in various Academies went down, which amply demonstrated the usefulness of psychological tests in selection. With the expansion of the scope of the Research Wing, the Directorate of Psychological Research came into existence in 1962.

A survey of the research work done in this country in the field of military psychology will now be presented in accordance with the classification adopted for the Psychological Abstracts published by the American Psychological Association.

Selection and Placement

Prior to the development of tools of selection, an extensive analysis of military jobs was done (PRW: 3, 1950). Senior military officers were asked to describe the qualities considered essential for military officers. These descriptions were analysed and qualities different in name but similar in content were subsumed under one category.

Subsequently, glossaries were prepared and further studies carried out to ascertain the essential military qualities (PRW: 6, 1950; 7, 1950; 23, 1950; 44, 1952; 71, 1952; 139, 1955; 141, 1955; 142, 1955; 193, 1959).

I. Rating Scale

Considerable attention was paid to the development of the rating scale (Mediratta, 1958) found useful in ensuring the rational distribution of marks. A few research studies (DPR: 261, 1966; 279, 1967; PRW, 110, 1954; 137, 1955; 180, 1958; 189, 1959) showed that it was useful to employ the rating scale first while assessing the candidate and then to convert this assessment into marks. This method helped in the distribution of marks more rationally over the entire rating scale. Reports relevant in this connection are: PRW: 50, 1952; 54, 1952; 101, 1954.

II. Intelligence Tests

Intelligence tests have an important place in selection the world over. India being multilingual, it was felt that a non-verbal test of intelligence would be of considerable help. At the same time, the higher levels of intelligence can be expressed only through symbolic thinking and language is the most universal vehicle of such thinking. Consequently, both verbal and non-verbal tests of intelligence were developed.

The assessment in courses which the selected candidates have to undergo in their career as military officers was used as a criterion for validating these tests. This was considered necessary because (i) in training, a large number of cadets work together and are observed together in more or less comparable conditions, and (ii) one who repeatedly fails in his courses cannot be expected to become a suitable officer. The performance in training, however, is a necessary though not a sufficient criterion (PRW: 41, 1952). The validity was thus determined by ascertaining the relationship between intelligence test scores of candidates and their performance at the unit stage. One paper (PRW: 62, 1952) deals with the merits and defects of such a criterion measure.

The added experience in the field of test construction, however, has led to the use of more sophisticated methods of item-analysis. Factor analysis of intelligence tests has given useful information on many aspects of intelligence (DPR: 272, 1966; Warhadpande and Khullar, 1963). The intelligence tests constructed have been found to have significant positive correlations with other Selection Board

assessments (PRW: 221, 1962; 227, 1962). A person in Grade I in intelligence has a better chance of becoming a successful military officer and a person in Grade 7, the lowest grade, has the least chance (PRW: 201, 1960; 208, 1961). Those higher in intelligence show better performance during the training period, not only in academic subjects but also in military subjects (PRW: 211, 1961). Course-wise performance of candidates on intelligence tests was investigated (PRW: 209, 1961). A few studies are: DPR: 235, 1964; 277, 1967; 278, 1967; PRW: 17, 1950; 18, 1950; 21, 1950; 59, 1952; 126, 1954; 127, 1954; 128, 1954; 210, 1961; 219, 1962; 224, 1962; 226, 1962; Warhadpande and Choudhary, 1960; Warhadpande and Mehta, 1961; Warhadpande and Mehta, 1962; Warhadpande and Sethi, 1964.

III. Personality Tests

In addition to intelligence tests, a few personality tests have also been developed specifically for assessing officer-like-qualities. Inter-rater reliabilities have been worked out for these tests. The assessments on these tests have been correlated with the assessment of personality qualities by the group testing officer and by the Board President in his interview (DPR: 291, 1969; PRW: 11, 1950; 24, 1950; 26, 1950; 36, 1951; 106, 1954; 230, 1962-1963). These tests have been studied from other points of view also (PRW: 55, 1952; 56, 1952; 95, 1953; 96, 1953; 97, 1953; 98, 1953; 104, 1954; 147, 1956; 148, 1956; 163, 1956). One Study discusses whether the mood depicted in the picture had any effect on the contents of the stories (PRW. 114, 1954).

The responses of the candidates selected and rejected were compared to ascertain the validity of the scoring system of the Thematic Apperception Tests (PRW: 156, 1956). A scoring system for different aspects of the story, such as, plot, hero's reactions, hero's qualities and the final outcome was devised. This system of scoring was validated against the final assessment of the Board (PRW: 135, 1954). Both chromatic and achromatic pictures were tried on a large sample of population and it was found that black and white pictures were more useful (PRW: 174, 1957; 181, 1958). The combined use of different projective tests has reduced the source of error likely to be caused by subjective factors inherent in the technique. Studies connected with the performance of candidates on different personality tests are DPR: 280, 1967; PRW: 48, 1953; 144, 1955; 145, 1955; 171, 1957; 179, 1958; 183, 1958; 190, 1959; 191, 1959; 192, 1959.

IV. Group Testing

At Services Selection Boards, these tests consume most of the

time of the candidates. Whenever different tasks are allotted to candidates at different Boards, the Group Testing Officers satisfy themselves that the tasks are of equal difficulty. The level of the difficulty is ensured by noting the time taken by comparable groups of candidates for finishing the task (PRW: 117, 1954; 119, 1954). The assessment by this technique is validated against the assessment of the total Board marks and against the performance in training and on the job (DPR: 283, 1967).

A study (PRW: 88, 1953) was conducted to see whether the group in which the candidate was placed made a difference in assessment. It was found that with the precautions taken at the SSBS, this has very little influence. The GTO assessment, it need hardly be said, is based on the complexity of behaviour pattern displayed by a candidate during testing. Studies on various aspects of GTO tests are: DPR: 282, 1967; 284, 1967; 292, 1969; PRW: 42, 1952; 51, 1952; 74, 1953; 75, 1953; 80, 1953; 84, 1953; 93, 1953; 94, 1953; 132, 1955; 151, 1956; 161, 1956.

V. Interview Techniques

One of the perennial problems in selection is the standardization of the interview technique. After prolonged research, schemes have been evolved for finding out which questions are most diagnostic and the manner in which they could be framed most effectively (PRW: 9, 1950; 34, 1951). Prospective interviewers are trained in this method at the Directorate.

VI. Sociometric Technique

A study (PRW: 73, 1953) revealed that this technique is useful. Correlations between the Sociometric scores and the marks awarded by the GTO, Psychologist and the President were found to be statistically significant (PRW: 99, 1953). However, despite the promising features of the technique, it is not feasible to introduce it at the Selection Boards. Other studies are: DPR: 263, 1966; 276, 1967. Applicability of other techniques of social psychology has been discussed (PRW: 70, 1952).

VII. Aptitude Tests

Aptitude tests occupy an important place in selection and placement. This is particularly so in the case of the personnel for Air Force who need to have very special abilities. For pilot selection, Pilot Aptitude Battery was adapted. This battery consists of three tests,

namely, (i) Instrument Comprehension Test (INS-B), (ii) Control Velocity Test (CVT), and (iii) Sensory-Motor Apparatus Test (SMA). In addition to work done on the selection of pilots, work pertaining to job-analysis of flying skills has been done (Tyagi, 1966a, 1967). The studies on the assessment of pilot potential and their follow-up (DPR: 245, 1965; PRW: 22, 1950; 185, 1958) were carried out. With a view to locating the factors associated with flying wastage, a few studies (DPR: 238, 1964; 249, 1965) were done. These studies have shown that low score on the Pilot Aptitude Battery has its effect on increasing wastage in training. The results of a few studies have shown that the performance on PAB differs with age (PRW: 159, 1956; Tyagi, 1969). One study was conducted to investigate the validity of the Navigators' Aptitude Battery (DPR: 271, 1966). The performance of airmen in pilot courses was also studied (PRW: 115, 1954). Some work has been done in other areas of aptitude testing. A few other tests developed are: (a) a test battery for the selection of medical students (DPR: 266, 1966); (b) a battery of tests for the classification of Torpedo and Anti-submarine Sailors (Sharma, 1959); (c) a test of Numerical Ability for the classification of Gun Control Rates (Dass, 1963); and (d) a test of Visual Signallers in the Navy (Dass, *et al.*, 1965). The results of a few more studies are summarised in DPR: 242, 1965; 246, 1965; PRW: 77, 1953; 121, 1954; 167, 1957; 195, 1960; 197, 1959.

VIII. Miscellaneous

One investigation showed that the pass-rate among repeaters is high (PRW: 38, 1952) and another study revealed that the different assessments of the same candidate are very much at variance (PRW: 37, 1962). 41.2 per cent of the re-interviewed candidates pass at a subsequent appearance (PRW: 49, 1952), 9 per cent of those re-interviewed appeared 4 times or more (PRW: 45, 1952). The average improvement of the re-interviewed was of the order of 2.6 per cent marks (PRW: 157, 1956). The repeaters constituted 23.5 per cent of the total NDA and 51.3 per cent of the total IMA candidates appearing at SSBs (DPR: 258, 1966).

The performances of different types of candidates have been compared in several studies (PRW: 81, 1953; 146, 1955). Candidates for NDA have an overall pass-rate of 46.3 per cent at the UPSC examinations (DPR: 248, 1965). NCC cadets performed better at the Selection Board stage but they did not score equally well in comparison to direct entry cadets at the Academy (PRW: 176, 1958). The rate of success at the Selection Boards has been found to be significantly higher by about 8 to 10 per cent for the candidates

with NCC background (PRW: 212, 1961). NCC cadets do not secure as high grades as the direct entry cadets at the Academy (PRW: 118, 1954). NCC cadets interviewed are generally much in excess of the vacancies available (PRW: 205, 1960). On the whole, NCC training does help in selection (PRW: 47, 1952).

The UPSC marks have better dispersion (DPR: 268, 1966) and the overall performance of the candidates is directly related to their educational levels (PRW: 20, 1950). Those who do better at the UPSC do better at the Services Selection Boards (DPR: 260, 1966).

Candidates coming before the Selection Boards come from the various strata of society (PRW: 25, 1950: 64, 1952; Tyagi, 1964; Tyagi and Mehta, 1965a and 1965b; Tyagi, 1966b). The pass-rate was higher for urban candidates coming from high income groups as also for those coming from Public Schools. Some studies relating to socio-economic factors are: DPR: 232, 1963; 233, 1963, 234, 1963; 237, 1964; PRW: 40, 1952; 89, 1953; 90, 1953; 91, 1953; 92, 1953; 109, 1954; 122, 1954; 168, 1957; 216, 1962.

It was found that the assessment based on the rating scale and the pen picture are about the same both at the SSBs and the NDA (PRW: 72, 1953). A few studies conducted are: PRW: 140, 1955; 172, 1957; 188, 1959.

Training

Although no research work has been done on training methods, some studies having relevance to other aspects of training were undertaken. These studies mainly relate to (i) comparison of different types of entries in terms of their performance in training; (ii) flying training; and (iii) assessments in training academies. Studies comparing the performance of ex-NDA cadets with others at the training institutions are: DPR: 231, 1963; 243, 1965; 262, 1966; PRW: 76, 1953; 149, 1956; 164, 1956; 169, 1957; 175, 1957; 177, 1958; 178, 1958; 187, 1959; 194, 1959. On the whole, it has been found that ex-NDA cadets do better than other entries at IMA. Studies of the performance of NCC cadets (DPR: 236, 1964; PRW: 111, 1954; 154, 1956; 206, 1960) showed that the military training they had already received does not put them at an advantage over others at IMA.

Studies of Pilots' Courses revealed that cadets screened through Pilot Aptitude Battery fared better. Cadets with flight experience have some advantage in the initial stages of training. Failure due to causes other than those related to performance in flying are rare. The pertinent studies conducted are DPR: 240, 1965; 273, 1967; 293, 1969; PRW: 39, 1952; 52, 1952; 53, 1952; 83, 1953; 86,

1953; 100, 1954; 107, 1954; 116, 1954; 124, 1954; 129, 1955; 134, 1955; 155, 1956; 158, 1956; 173, 1957; 207, 1960.

Further studies relating to training are: PRW: 12, 1950; 14A, 1950; 30, 1951; 58, 1952; 82, 1953; 184, 1958. On the basis of the results of these studies, it became evident that the NDA assessment allows a weight of 5 to learning capacity as compared to 3 for personality and character. The OLQ assessments at the NDA have statistically significant positive correlations with Intelligence grades and other Selection Board assessments. The training in the Academics does not result in any improvement in intelligence test score, but some improvement in officer-like-qualities is observed (DPR: 275, 1967). Other pertinent studies are: DPR: 239, 1964; 270, 1966; Unpublished, 1969a; PRW: 19, 1950; 102, 1954; 103, 1954; 108, 1954; 113, 1954; 120, 1954; 123, 1954; 135, 1955; 136, 1955; 150, 1956; 213, 1961; 215, 1962; 223, 1962.

For teaching Algebra and Electricity in the Defence Academies, a self-tutoring device was found effective (PRW: 218, 1962). Simplified methods in the training of Artificer Apprentices and other technical skills have been suggested (PRW: 61, 1952; 63, 1952; 65, 1952). Adiseshiah (1952) made certain recommendations for improvement in the flying training.

Task and Work Analysis

Analysis of motor skills of Artificers and operators of excavation machinery (DPR: 269, 1966) revealed that, although good operators finish mirror-drawing quickly, their accuracy remains low. The aged persons were slower in the rate of manipulation. It was further noticed that the length of service helps in target-hitting. A study of motor learning showed that distribution of practice is advantageous only for speed and not for accuracy in mirror tracing (DPR: 250, 1966).

The reaction time for signals in noisy environment was found to be a function of the signal to noise ratio; at low ratios, the inter-individual and intra-individual variations increased considerably (Rao and Nayak, 1958). The effect of ambient noise on performance could not be detected (DPR: 287, 1968), perhaps because the sample studied was habituated to noise. Concentration of attention got adversely affected by loud noise, ranging between 90 to 95 decibels (Adiseshiah, 1959). The speed of response has been found to depend on the frequency and intensity of the signal (Rao and Nayak, 1956). Continuous duty for four hours does not cause any fatigue to the signallers (Adiseshiah, 1955).

From the study of the physical and psychological qualities required

of a diver (PRW: 182, 1958), it was found that apart from the proper functioning of the heart and lungs, intelligence and mechanical aptitude of a level above the average are also necessary.

The changes in performance of army signallers during the course of the day were studied and the work-curve prepared (Defence Science Organization (DSO): 3, 1954). It was further found that 'Speed Stress' adversely affected the accuracy of their psychomotor performance whereas 'Load Stress' adversely affected timing (Adiseshiah 1955). A study of the work of Asdic operators showed that (i) optimum duration of a watch is between 40 to 50 minutes, (ii) the senior sailors give poor performance as compared to junior sailors, and (iii) practice in the first trial has no significant effect on the second trial (DPR: Unpublished, 1969b). No appreciable difference in the index of mental effort between spells of work and spells of relaxation was observed. Similarly there was no difference between the personnel working in deck spaces and those working in machinery spaces (Malhotra and Adiseshiah, 1954).

Essential characteristics of various trades of naval gunnery were studied and different qualities described (DSO: 1, 1959). The jobs for various Radar Plotters have been described and the psychological requirements stipulated (DSO: 2, 1959). The same has been done for Quarter-Master rates (DSO: 3, 1959), Submarine Crew (DPR: 251, 1966), Naval Aviation rates (DPR: 241, 1965) and Torpedo and anti-submarine rates (PRW: 214, 1962). Besides, the job summaries of various branches were undertaken. Studies in this connection are: DPR: 267, 1966; 274, 1967; PRW: 10, 1950; 14, 1950; 35, 1951; 105, 1954; 200, 1960.

A study of the importance of body-size revealed that heavy-built soldiers show greater endurance than light-built soldiers (DPR: 265, 1966).

Performance and Job Satisfaction

A study was conducted to investigate the precipitating factors in psychiatric illness in the Army (DPR: 286, 1967). Psychiatric cases reported in 1964 and 1965 were studied. It was found that precipitating factors were identifiable in 68.3 per cent cases. The major factors were: (i) domestic and personal, (ii) financial difficulties, (iii) illness of wife and children, (iv) difficulties about property, (v) service factors such as dislike of the job, and (vi) failure to get promotion. Further, in field-service areas, domestic factors assumed greater importance in precipitating psychiatric illness. Pre-enrolment psychiatric screening, greater care of separated families, arrangement for prompt delivery of private mails, and proper selec-

tion and placement of personnel have been suggested as preventive measures.

One of the factors that affect the morale is adverse job conditions. In non-family stations, soldiers have to live separated from their wives and are thus denied normal channels of sexual gratification. A study of such soldiers (DPR: 244, 1965) shows that in a situation of this sort, some of them fall back upon various substitute gratifications. Participation in athletics, artistic and recreational activities serve to ease the strain of sexual deprivation.

Special Environment

The human organism functions efficiently in a specific environment which is regarded as normal. But in the military field, one has to function very often in an environment that is anything but normal. The effects of such abnormal environment have, therefore, to be studied and measures for combating its evil effects devised (DPR: 289, 1967; PRW: 67, 1952; 143, 1955).

The effect of partial oxygen want and general function of the pilot flying at high altitudes has been investigated (Jain and Khullar, 1965). It was found that the effects of hypoxia are apparent only at altitudes of 12,000 feet and above. Methylene Blue does not seem to enhance tolerance to oxygen want. The effects on mental efficiency could not be determined accurately because investigations could not be conducted over a prolonged period. In short-duration experiments, no detrimental effects of closed-in space were found (PRW: 153, 1956). Simulated under-water conditions had some adverse effect on performance (Dass and Bhattacharya, 1964). The soldiers posted at high altitudes and in jungles were studied to see how far the adverse conditions affected them. Here also, no pronounced effects were observed (DPR: 252, 1966). Adverse effects were at first noticed between an altitude of 8,000 to 12,000 feet (PRW: 68, 1952).

Noise seems to have an adverse effect on work in gun turrets (PRW: 199, 1959). It affects different individuals in different degrees, as judged by two types of transient hearing-effect, namely, masking and auditory fatigue (Rao and Murthy, 1965). Mental work involving vision suffers under noisy conditions (Adiseshiah, *et al.*, 1961). Isolation did not produce adverse effects on mental functions during the short experimental period (Dass and Rao, 1962).

Advertising and Consumer Psychology

The survey of available literature on the subject of brain-washing

(DPR: 288, 1967) shows that the methods used by the Chinese were only partly effective. They were able to elicit a certain amount of collaboration. The lasting effects of their indoctrination programme were, however, negligible as was evidenced by the fact that only 21 out of a very large number of American POWs refused repatriation. There was nothing new in the method employed by the Chinese nor was the procedure irresistible. Different psychological aspects of propaganda have been discussed in another study (PRW: 87, 1953).

Engineering Psychology

The psychological factors involved in operating machines are taken into account when designing them. A preliminary paper on this subject (PRW: 69, 1952) outlines the type of research involved in this area. Weapons have to be designed bearing in mind the psychological factors along with others. A beginning was made in psychological research concerning the designing of arms (DPR: 256, 1966). Some combatants were interviewed and on the basis of data obtained, it was found that, with certain modifications in the design of small arms, efficiency could be improved.

The Target Reading and Plotting Apparatus is used for simulating the task of a radar-plotter sailor. Scoring keys for this apparatus have been prepared (DPR: 257, 1966) and details of scoring procedure worked out.

Displays and Controls

The conventional three-pointer altimeter installed in Aircraft cockpits presents a dial-face which is difficult to read. Certain changes in the shape of the pointers have, therefore, been introduced to see if this makes the altimeter easier to read. The speed and accuracy in the altimeter and setting were used as criteria for judging the two types of dial-face. The results indicated that the modified design was easier to read and the confusion between the pointers was very much less than what is found in the conventional design (Adiseshiah and Rao, 1956). The study on the effect of speed stress revealed that experience in high speed flying contributes significantly to the adaptation of speed stress related to single channel display conditions (Adiseshiah, 1957).

Driving and Safety

The changes in the response time resulting from flying jet aircraft

for short spells of time have been investigated (Adiseshiah and Rao, 1955). Pilots of highspeed jet aircraft show a slowing down of response after spells of flying. The degree of slowing down depends on the nature of the flying exercises. The accident liability among the M.T. Drivers has been investigated (DPR: 281, 1967). 71 Army drivers comprising the accident-group and a comparable group of 105 accident-free drivers were administered psychometric tests. The results revealed that the accident-group was slower than the accident-free group in choice reaction time; it was also inferior in terms of accuracy in eye-hand coordination. The trend in aircraft accidents was studied for the period 1950-57 (PRW: 186, 1958). The results were: (i) the number of accidents tended to remain more or less stable, (ii) the rate of major accidents tended to remain constant, (iii) the rate of fatal casualties fluctuated, (iv) the number of accidents during landing tended to decrease whereas those occurring in flights proportionately tended to increase, and (v) accidents due to pilot-error tended to drop. A study revealed that errors committed by pilots fall in the following four categories: (i) those due to lack of flying skill, (ii) those due to lapses of vigilance, (iii) those due to faulty display of control and (iv) those due to hypoxia (Rao, 1961). Safety in night flying can be improved by providing a better type of altitude display to the pilot (Rao, 1956).

An investigation of accident repetition has shown that majority of the accidents involving the same pilot occur within six months of the previous one. The pilots who had only one accident each during the five-year period under study (RDO: 2, 1961) accounted for one-third of the accidents. Accident proneness does not appear to be a major problem in the Air Force (Rao, 1960).

There was no deterioration in the mental efficiency of the pilots after normal routine sorties lasting less than an hour (DSO: 1, 1955). Some indication of slowing down of responses after the flying sorties (especially 'hard' ones) was found during the summer months (Rao, 1955). The results of a study (PRW: 203, 1960) showed that visual, auditory and proprioceptive illusions often arise in flying.

The spraying of Dieldrex-18 (an insect repellent chemical) on runways in India has proved useful in preventing birds from sitting on the runways but has not been successful in preventing them from hovering around airfields. The effectiveness of this chemical is greatest during the monsoon months (Adiseshiah, 1957b).

Conclusions and Suggestions

From the foregoing survey of the research studies done in this country, it will be evident that there is a great need for conducting

more research investigations on numerous problems in the field of Military Psychology. One is not infrequently struck by the absence of any work on problems falling within the area of Vocational Choice and Guidance. Work on the cognitive bases of the choice of military career is very much needed. Some of the problems demanding investigation are those relating to the determination of motivational factors underlying such a choice and the value systems developed by individuals. This is specially important when it is found that quite a number of officers and other ranks, after having received training for some time, realise that the picture of military career which they had prior to selection was different from the one experienced in the course of the training. A few studies could be fruitfully conducted on psychological needs and vocational maturity of trainees. Expressed motivations for different arms and trades have to be assessed, and value orientations, religious identities, beliefs and ideological convictions of candidates coming from the different parts of the country carefully studied. The relationships among self-concepts, ideal self-concepts and stereotypes of probable and ideal choices need determination. Both cross-sectional and longitudinal studies of interest profiles could be undertaken.

Another important area that has escaped attention is that of Management and Organization. Authority is one of the phenomena in military set-up which is becoming the centre of special study. It, therefore, becomes necessary that the relation of authority to positions of superiority and subordination, the acknowledgement of authority and compliance, and the relation between authority and power, leadership and prestige, be examined. It need hardly be mentioned that a specialized and rigid organization characterising the classic management theory is only efficient with totally specifiable type of work. The majority of work today requires participative management for increasing efficiency. It may be seen by conducting experiments whether or not such a thing holds good equally well in the military context. Several problems relating to channels of communication should also be given due consideration. Research in the application of behavioural science theories to problems of organization prevailing in the military is no less important. An empirical investigation on the basis of correlates of command motivation in battle conditions has a special significance. In order to provide a better understanding of the organizational role of the high-level military commander, it may be necessary to undertake studies based on the existing knowledge of techniques and tools of the different social sciences. For bringing about efficiency in management, case study, longitudinal case study, a small-sample study, and a small-sample longitudinal study, should be undertaken.

A few problems pertaining to the relationship between decision-making and personality variables as also communication correlates of interpersonal sensitivity among military officers deserve consideration.

One hears a good deal about programmed learning and self-teaching methods. There is tremendous scope for research to find out how far programmed learning and self-teaching devices can be used in military training institutions and academies. An experimental leadership training programme has to be developed. This will throw light on the active role of the leader in motivating and facilitating performance as well as in reducing disruptive influences. A few studies on (i) need for providing objective and standardized evaluation of trainees, (ii) methods for studying trainees' performance in combat situations, (iii) use of simulation in training, (iv) stress in training, (v) quality control of training, (vi) differential approach to training, and (vii) motivation and incentives in basic combat training may help solve diverse problems of military training and lead to the development of a sound programme of training.

It need hardly be mentioned that the problems in some areas mentioned above are by no means exhaustive. In other areas also, there is need for formulating research problems. For instance, studies for predicting the probable behaviour of civilians and the effectiveness of soldiers in nuclear warfare as also research in designing tasks to suit the potentialities of the human operator can be of immense value. Since our country is rich in man-power and poor in equipment, the problem of compensating deficiency in equipment has to be tackled by a programme of developing potential man-power. This obviously needs considerable research effort.

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7

Personality

A Trend Report

By

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Concept of Personality in Ancient India

THE EARLIEST attempts at the conception of personality are found in the scriptures of the Hindus: the Vedas and Upanishads. Personality in the Upanishads is conceived as a synthesis of matter (*anna*), life (*prana*) and mind (*manas*) (Bose, 1930; Chennakesavan, 1960; Sastry, 1932; Sen, 1943, 1957).

The classification of persons by the three characteristics, namely, harmony (*satwa*), mobility (*rajas*) and inertia (*tamas*) was popular among early Indian thinkers and it has been discussed by Boaz (1957a) and Krishnan (1960a). During the epic period, one comes across classification of persons in terms of ethical and moral characteristics (Krishnan, 1960a). The characteristics of integrated personality are dealt with in Shrimad Bhagavat Gita (Kuppuswamy, 1959). Attempts to classify people according to body types have also been made by ancient writers like Vatsayana, Kokkaka and Siddhanagarjuna (Krishnan, 1960a).

A clear account of personality is seen in the Samkhya system of Indian philosophy. In this system, two independent entities, namely, spirit (*purusa*), and nature (*prakriti*) are postulated. The spirit refers to the psychic element and nature refers to the physical element, constituting the personality of an individual (Chennakesavan, 1960; Krishnamurthy, 1961; Asthana, 1966).

The systems of personality propounded in western culture have been compared with ancient Indian theories by a few investigators (Khanna and Khanna, 1959). Despite some attempts at theoretical evaluation of ancient Hindu concepts of personality, practically no

systematic empirical verification of these concepts has been made so far. Indian psychologists have been cautious in accepting the theories developed in the Western culture. Asthana (1949, 1966, 1967) has attempted an evaluation of historical and experimental approaches to personality. Srivastava (1968) has made an analytical study of Jung's ideas as related to Indian thought.

Contemporary Researches

Among the recent theoretical attempts at identifying the determinants of personality, the works of Rao (1950) and Boaz (1957b) are important. The researches in personality are at present mainly confined to applying and verifying theories of Rosenzweig (1934, 1944), Allport (1937), Murray (1938), Maslow (1942, 1952), Cattell (1946, 1950), Eysenck (1947) and McClelland (1951). Even here the pre-occupation has been with instruments rather than with the verification of their theories. It may be argued, however, that, since each instrument is directed toward specific research in the field of personality, the study of multifarious instruments adapted and developed may provide us with an understanding of the divergent approaches prevalent today.

The instruments employed may broadly be classified under three categories: questionnaire-inventories, projective techniques, and behavioural tests. While a few of the studies are based on the use of *one* of these instruments, an increasing number of them have used more than one and have often combined structured personality inventories with semi-structured and unstructured tests.

Questionnaire-Inventories : Adaptations

Questionnaires, also called inventories, have served as tools for a major part of research on personality. They are patterned on those developed by psychologists in other countries. Many of them are translated into various regional languages.

Jaiswal (1969) has used Guilford-Zimmerman Temperamental Survey (GZTS) for a number of studies. Using Indian subjects, Khan (1962) has found GZTS to have adequate construct validity. Gupta (1962, 1968a) has adapted this test to Indian population and has also developed norms for it. Sinha (1968a, 1968b) has adapted this inventory to a Hindi speaking population. The adaptation of 16-P.F. Questionnaire of Cattell to Indian samples has also been made by different investigators (Bhagoliwal, 1960; Jalota, 1958; Joshi, 1965; Kale, 1966; Kapoor, 1964b, 1966; Mohan, 1964; Phadke, 1968 and Rao, 1961). In the same way the High School Personality Ques-

tionnaire (HSPQ) of Cattell has been adapted to the Indian setting (Kanthamani, 1968).

The Maudsley Personality Inventory (MPI) has been used in this country in a variety of studies and its adaptation has been done in several Indian languages like Tamil (Shanmugam, 1960); Oriya (Das, 1961); Bengali (Banerjee and Mallik, 1962); Hindi (De, 1966; Singh, 1966; De and Sinha, 1968); and Panjabi (Jalota, 1964). The revised version of M.P.I. namely, Eysenck Personality Inventory (E.P.I.) has been increasingly used in recent years. Using its original English version, Muthayya (1968, 1969) studied the relationship between personality, achievement motive and personal orientations. Bhushan (1969a) has prepared the Hindi version of E.P.I. Paramesh (1969) has used a Tamil version of E.P.I. in his study. Pande and Kanekar (1969) have found the items of E.P.I. to possess fair discriminative power. Prabhu (1970) has found this inventory to possess clinical validity.

Mohan, Singh and Kalra (1968) have adapted S.B.G. Eysenck's Junior Personality Inventory (J.P.I.) to Indian samples. Mohan and Purang (1969) have used this inventory in their comparison of Uttar Pradesh and Delhi samples.

Allport's Ascendance-Submission Reaction (A—S Reaction) Test has been in use in India both in the original and translated forms (Roy-Chowdhury, 1954; Roy-Chowdhury and Gandhi, 1958; Roy-Chowdhury and Hundal, 1958). Hundal (1965) has also done an item analysis of this inventory. Parameswaran and Oliver (1961), Parameswaran and Sundaram (1962), Parameswaran and Goverdhan (1964), Parameswaran, Goverdhan and Sayeed (1968), Bhogle and Rao (1965) have adapted this inventory to Indian setting using different samples.

Allport-Vernon-Lindzey study of values has also been in use in India (Roy-Chowdhury, 1959a, 1959b).

The Minnesota Multiphasic Personality Inventory (M.M.P.I.) has been in use in adapted forms. Singh (1965a, 1965b) has found scales like hypochondriasis, Hysteria, Masculinity-Femininity and Psychopathic Deviate to be valid in the Indian setting. Gupta (1968b) found sex differences on certain scales of the inventory. The individual scales from M.M.P.I. like Psychopathic Deviate, Social Introversion are used separately for specific researches (Chatterjee, 1965; Shanmugam, 1969; Paramesh, 1970).

Edwards Personal Preference Schedule has also been adapted to Indian setting (Fuster, 1964). Another inventory adapted is Bernreuter Personality Inventory by Gayen and Saha (1954) and Gayen, Saha and Mathur (1960) and Mohanty (1965). Kundu (1967) and Khanna and Kundu (1968) have adapted this inventory in Bengali.

Many other questionnaires in original and in the translated form have also been in use in this country. They include: Cattell's Neurotic Questionnaire (Asthana, 1945; Kapoor, 1965, 1968b; Kapoor and Kapoor, 1968); Cattell's Disposition Scale (Hafeez, 1952); Maudsley Medical Questionnaire (Shanmugam, 1957c; George and Nair, 1968; Singh, 1966; Agrawal, 1967); Traditional Family Ideology Scale of Levinson and Hauffman (Muthayya, 1958; Sarma, 1965a), Neymann Kholstedt Scale (Rajangam, 1957; Namdeo, 1967); Emotional Maturity Checklist (Mohsin, 1960); Tavistock Self-Assessment Inventory of depressive traits and symptoms (Hazari, 1960); Maslow's SI-Scale (Rath, 1961); Gough's Prejudice Scale (Sarma, 1965a); California F-Scale (Bhushan, 1967); Taylor's Manifest Anxiety Scale (Santhanam, 1965); Krogg's Defence Mechanism Test (Kanthamani and Johnson, 1967); Sarason's Test Anxiety Scale and General Anxiety Scale (Nijhawan, 1968); Children's Manifest Anxiety Scale (Durett, 1965; Raina, 1969); Schiae's Rigidity Scale (Ramamurthy and Ananthakrishnan, 1967); Aggression-Hostility Questionnaire of Green and Stacey (Prabhu, 1968); Eysenck Rigidity Scale (Shanmugam, 1969); and Bell's Adjustment Inventory (Nataraj, 1968).

Questionnaires-Inventories Developed in India

Side by side with these attempts at adaptation of questionnaire-inventories to Indian conditions, research efforts have also been directed at developing and standardizing new questionnaires of our own.

As cited by Bisi (1950), Bose was the first to develop an Inventory in India in 1930. Shanmugam standardized a Personality Inventory in Tamil modelling it on Woodworth's Personality Schedule and Thurstone and Thurstone's "Neurotic Inventory" (1953a, 1954). He used it initially to study the personality of juvenile delinquents and criminals (1946) and subsequently of adolescent boys, girls (1956a, 1956b) and sex delinquent girls (1956c). This inventory has been used by other investigators also (Lakshmi, 1967). Sastry (1950) has constructed a questionnaire to measure physical, personal, economic, social, ethical, civic, religious, and cultural aspects of security-insecurity. Saxena (1952, 1963) devised an inventory which measures adjustment of children to home, health, emotion and society.

Asthana (1960a) developed an adjustment inventory for the purpose of detecting maladjustment among school children. Parameswaran (1958) has also devised an adjustment inventory in the line of Thurstone and Thurstone.

Kumar (1961a, 1961c, 1961d, 1963a) found the inventory deve-

loped by Asthana to be dependable with college students. Sinha's (1961, 1965) anxiety scale is an impressive development in the area of personality questionnaires. The scale, bearing the name of the author, was standardized on college students (Sinha, 1961) and is found to have a high correlation with Taylor's Manifest Anxiety Scale.

Mittal's (1962) Inventory, patterned on Bell's Adjustment Inventory, is available both in Hindi and Marathi. Chawla (1967) found this to be a valid instrument among higher secondary as well as college students. The Kundu Neurotic Inventory (Kundu, 1958, 1962, 1963, 1964, 1969) which aims at detecting neuroticism at the early stage of a child's development can be of help to counsellors in their task of selection, experimentation and diagnosis. The inventory is found to be positively correlated with Neuroticism, Introversion-Extraversion and Self-confidence Scales, and negatively with Dominance-Submission Scale (Khanna and Kundu, 1968).

Drawing inspiration from the Minnesota Multiphasic Personality Inventory (MMPI), Krishnan's (1959) Mysore Personality Inventory was developed and standadized to assess the individual's adjustment in seven specific areas, namely, family, emotion, social, mood, reality-orientation, delinquency, and leadership. The 'D' Scale and the 'L' Scale of this inventory have been found to be useful in detecting delinquency and withdrawal tendency among college students (Krishnan, 1964, 1965).

A few value scales have also been devised by the Indian investigators. Ramadevi (1962) constructed a value scale to study the influence of university education on traditional values. Pareek and Chattopadhyaya (1965a) have devised another value scale for farmers.

Narayana Rao (1962, 1964a, 1967a) constructed the S.V.U. Personality Scale to study neurotic difficulties among university students. Rao (1964) and Reddy (1964) have constructed adjustment inventories to be used with young and adolescent subjects. Raman (1967) devised a neurotic inventory to diagnose the degree of severity of neuroticism in the industrial workers with the purpose of counselling them. Another important instrument in this field is Dutt's 'Neurotic Inventory' (Dutt, 1970). Sinha and Sinha (1969) have developed a comprehensive test of anxiety. Ramamurthy (1969) constructed questionnaires to assess frustration reaction patterns. Prabhu (1968) constructed a scale for assessing aggression and hostility.

Loomba (1961) constructed a new type of sentence completion technique for studying the self-concept of an individual. Mukherjee (1965a, 1965c, 1965d) has developed a sentence completion device for studying achievement motive. This test consists of a number

of forced-choice triads and has a fair degree of reliability and validity (Mukherjee, 1965a).

A number of tests on various other personality variables have been developed and are in use in this country. Das (1958b) has constructed a hypnotic susceptibility scale. Patel (1961, 1965a, 1965b) constructed scales to assess such personality dimensions as extraversion-introversion, conservatism and anxiety. A questionnaire for the study of individual and social values constructed by Shakeela Begum and Hafeez (1964) includes items on ambition, courage, harmony, cooperation and the like. Delinquency-Proneness Scale (Ray, 1963, 1964) and Dependance-Proneness Scale (Sinha, 1966a, 1968b) are other important inventories developed and used to investigate specific problems in personality researches.

Projective Tests

Ramachandra Rao (1964) used TAT in its original form on Indian subjects. An attempt at the adaptation of TAT was made by Mehrotra (1962). He changed only the costumes in the original pictures of Murray to suit Indian conditions, except in the case of picture-1 in which he has changed the violin into a sitar.

Chowdhuri (1960b) developed and standardized a Children's Apperception Test (CAT) for use on Indian children. The same investigator (Chowdhury, 1960a, 1967) has standardized TAT for use on adults and young persons. There has been also an attempt at adapting Symonds' set of pictures for use with the adolescents (Kureshi, 1966).

Rosenzweig's Picture-Frustration (P.F.) Test was adapted to Indian conditions by Pareek (1958). He used teachers' ratings and also discrimination between delinquents and non-delinquents in validating his test. In a similar way Muthayya (1960a, 1961a, 1962) developed a frustration-reaction test called 'The Madras Picture-Frustration Test'. It has been found to possess adequate validity as gauged through a comparison between delinquents and non-delinquents (Muthayya, 1962). A verbal form of the Madras Picture-Frustration Test has been developed by Muthayya and Lalithambal (1968).

Veeraraghavan (1966) and Tamhankar (1969) have adapted the McClelland's Achievement Motive Test to Indian conditions. Some of the other projective tests used in this country are: 'Draw-A-Man-Test' (Phatak, 1960, 1961, 1962a, 1962b); 'House-Tree-Person Test'; Mosaic Test; MAPS (Sharma, 1964; Sharma and Chatterjee, 1967); 'Picture Projection Test' (Varma, 1957, 1959); and 'Sentence Completion Technique' (De and Giri, 1962).

The Verbal Projection Test (VPT) of Shanmugam (1951, 1955b, 1956a, 1956d, 1957a) tries to combine the laboratory approach to perception with the clinical approach to projection. Drawing its idea from the Word Association Test of Jung and TAT of Morgan and Murray, the test includes 20 items called "Armatures" referring to five important areas, namely, family, sex, sociability, religion and health. The scheme of analysis for this test has facilities for quantification of the responses under various categories like needs, the effect of environment on the individual, reaction of the individual, dominant personality traits of the central characters and their future outlook (Shanmugam, 1952b, 1956a, 1956d, 1957a). The test has been found to possess adequate validity and reliability (Shanmugam, 1957d, 1958a).

Following the Guilford Zimmerman Temperamental Survey, Das (1963, 1966) has devised a personality test for adolescents using movie pictures. Pareek and Chattopadhyay (1965a, 1965b, 1967) developed a new projective technique using cartoons to assess 'change proneness'. Bhattacharya (1968) made an attempt to develop a projective test for the deaf and dumb subjects. It utilizes auditory and tactile stimuli. 'The Rigidity Picture Test', devised by Rabindradas (1969a, 1969b) represents an attempt to standardize, on adolescent subjects, a test of 'adherence tendency' in which each item presents a choice situation in picture-form and the subject is asked to choose one of the alternatives.

Reliability and Validity of Tests

Pars, Ram (1939) studied the validity of the questionnaire method only to discover that the questionnaires were useful in broader classification of individuals and not in individual diagnosis. Jalota (1949) studied the reliability of the questionnaire method using a short test and found that the questionnaire has low reliability. Shukla (1950), in an investigation on rating-reliability of judges, found subjective rating to rely much upon the ability of the judges. Mallik (1959) studied teachers' ratings and found their differential ratings of personality traits to be of doubtful value. Rath (1961) had his subjects judge their partners regarding their intelligence and neuroticism. He found that friends were attributed with greater intelligence and less neuroticism and that those who were not preferred as friends, tended to be rated as dull and neurotic. Tyagi (1965a, 1965b) studied personality ratings in the selection of candidates to the Defence services. He found that candidates with certain environmental facilities rated higher on personality qualities.

Gayen and Mathur (1960) conducted a factor analysis of Bernreuter Personality Inventory and found that much of the variance caused in the results could be explained in terms of two factors rather than four as conceived by Bernreuter.

Kapoor (1963a, 1964a, 1966) made an extensive analysis of Lie Scale in the Hindi version of 16 P.F. test and found the 'lie-scale' to have value in detecting subjects' distortional attitude on certain factors measured by the test. In a number of studies, Kapoor (1963a, 1963b, 1965) found subjects to be sensitive to item-forms with respect to lying. Further studies by him in collaboration with others (Kapoor, 1964b; Kapoor and Kapoor 1965) revealed sex differences to construe personality differences as assessed by 16 P. F. test.

Ray (1965) studied the relative efficacy of two different methods of items scoring using his 'Delinquency Proneness Scale'. He found the strong weighted scoring method to be more favourable for the type of test he has developed.

Verma (1965) studied the discrepancy between past and future performances under artificial and actual life conditions using the symbol-digit substitution test and examination marks. The results revealed that the size of the discrepancy between future and past performances can be looked upon as a measure of ego strength.

Devadasan (1966c) made a comparison of the rating abilities of psychology and non-psychology students. The results revealed that knowledge of psychology did not help the rating on personality traits.

B. N. Singh (1968) made a comparison between the anxiety scores obtained using the key items alone and the scores obtained using the full scale with buffer items. The patterns of the distributions of these two different scores were found to be strikingly similar.

In another study, Sinha (1968a) investigated the efficiency of reliability testing by test-retest method. He found that splitting the questionnaire and administering it at different spaced sittings tended to improve reliability.

Devadasan (1966a) studied the effects of critical mood in judging syllogisms. He found that a critical mood was not conducive for accurate judgement, though it had a positive effect in dealing with invalid syllogisms. Varma (1969) studied the influence of anxiety on perceptual judgment of facial expression and found it to induce a tendency to perceive unpleasant expression on faces.

Singh (1947) studied the use of projective tests in assessing personality. Asthana has conducted a series of studies using Rorschach Test and found this technique to be useful in assessing different aspects of personality (Asthana, 1956, 1963). He had earlier established norms for Indian subjects for this test (1950b). The test has

also been used by other investigators who have noted differences in Indian and foreign samples in length of the responses, popular responses, response time, and different proportions of perceptions (Kumar, 1960a, 1960b, 1961b, 1962a, 1962b, 1963b; Prabhu, 1967; Jain and Prakash Bindu, 1967).

Hazari and Sinha (1961) studied the Rorschach Ranking Comformity Test as suggested by Eysenck. They found this technique to have validity and reliability in differentiating neurotics from the normal.

Raychaudhuri and Maitra (1965b), in a Rorschach validational study, examined the Rorschach protocols of three adolescent groups, early, middle and late, with a view to relating growth-processes to the response pattern. A regularity of change was noted, indicating a progressive development of intellectual and effective dimensions of personality. In another Rorschach validational study, Raychaudhuri and Mukherji (1969) tested the kinesthetic hypothesis of Rorschach which states that while *M* responses increase under inhibition of overt aggressive expressions, the *FM* and *m* remain unchanged. The Rorschach was given to a group of prisoners under standard and experimentally induced agitation-inhibition condition. Since the results were not in the hypothesized direction, the validity of the kinesthetic theory was challenged.

Verma and Kumar (1966) attempted a cross-validational study of O'Reilly's 'Subjective Rorschach' using normal, neurotic and psychotic subjects. The findings came very close to the original findings of O'Reilly and indicated that the test could differentiate the three contrasted groups, but differentiation on an individual basis was not feasible. It was also possible for the investigators to predict, on the basis of the test-scores, the nature of prognosis as well as the probability of recovery.

A study conducted by the Ministry of Defence (1954) on TAT dealt with the influence of mood arising in TAT administration. The results suggest that the response of an individual is determined largely by the stimulate picture alone and not by the persistence of any mood created by the previous stimulus picture. It was also found that the pictures had, to some extent, differential effects on emotional over-flow. Sastry and Ramachandra (1960) found TAT to be useful in assessing aggression. In another investigation, Broota (1964) studied the responses on six pictures and one blank card of the Indian Adaptation of TAT. He found that reduction in number of cards does not affect the assessment of the traits. In an attempt to compare a few Rorschach variables with the factors obtained through a new personality inventory (MPI), Majumdar and Mukherji (1968) found high assessment equivalence between the two tests.

Das (1966) has found that judges with no experience in interpreting TAT protocols were able to give reliable assessments when they used a questionnaire type of analysis scheme.

Raychaudhuri and Maitra (1966) studied the validity of Szondi Test pictures on a group of delinquents and non-delinquents. According to them, the test failed to distinguish between the two groups and could, therefore, be considered to lack validity on Indian subjects. Pablo (1963) made a comparative study of the projective and socio-metric approaches to personality. The results indicated no significant relationship between them.

Mukherjee and Raychaudhuri (1967) examined the assessment equivalence of direct personality tests (Mooney Check-list) projective technique (Rorschach) and clinical rating, using a group of juvenile offenders as subjects. In spite of acceptable agreement among the three measures, the direct test exhibited low intercorrelation with the other two measures which were found to be significantly correlated.

Sharma (1964) and Sharma and Chatterjee (1967) investigated the hypothesis that the three projective tests, viz., Mosaic, Toy World and MAPS, though differing in structure, measure the same projective component and found it confirmed. Tiwari and Tiwari (1968) studied the usefulness of TAT, PF-study and Impulse, Ego and Super-Ego Test. The results showed that they all have only partial utility in assessing personality adjustment. A factorial study of a number of commonly used ratio-variances of the Rorschach was conducted by Majumdar and Mukherjee (1968). Employing Thurstone's centroid method, five factors were identified, namely, social facilitation-inhibition, flexibility-rigidity, ambiguity-tolerance, intellectual-affectivity and self-actualization.

Muthayya (1960a) studied a set of objective tests, such as Rotter's Level of Aspiration Board, card-sorting test and letter cancellation test. He found them to have high reliability in assessing the level of aspiration of an individual. Devadasan (1964) attempted a study of cross-cultural validity of a set of objective behaviour tests including visual acuity, static ataxia, tapping and tweezer dexterity. He found these tests to be free of cultural and socio-economic influences.

Studies on Achievement Motive

Mukherjee (1965b) studied the self-ratings of high achievement oriented and low achievement oriented groups, using his test of achievement motivation. He found high achievement group to rate themselves higher on perseverance and lower on intellectual ability. Mukherjee (1968) has also related n. Achievement to the order of

birth. In another study, Pande and Botkawar (1967) studied the personality of achievement oriented individuals using MPI and Mukherjee's Sentence Completion Test. The results revealed a negative relationship between verbalized need for achievement and neuroticism. Mukherjee and Sinha (1967) related manifest anxiety to achievement orientation using SCT as test of achievement orientation. They found anxiety to be strongly related to achievement orientation.

Muthayya (1967) studied the relationship between achievement motivation and autocratic-democratic attitude. The results revealed no significant relationship between them. In another study, the same investigator (Muthayya, 1968) related achievement motive to personality, using a projective technique and a questionnaire, but found no positive relationship. In two other studies of personality and achievement motive (De and Khan, 1969 and Muthayya and Rajeswari, 1969), no relationship with achievement motive was found. Shrivastava and Tiwari (1967) studied n. Achievement in relation to socio-economic factors and found the upper class people to have high n. Achievement and the middle class ones, the highest need-achievement. Sinha (1967) studied the achievement and affiliation motivation. He found the first born to be more achievement-oriented than the later borns who were more affiliation-oriented. Achievement motivation was found to correlate negatively with affiliation and level of aspiration. The same investigator (1968c) conducted an experiment to study the influence of need-achievement and need for co-operation under limited and unlimited resources. The findings revealed a definite relationship between the need conditions and limitations of the resources. Tamhankar (1969) studied achievement motive to test the hypothesis that relaxed, neutral and aroused conditions would give rise to a different intensity of achievement motive. The results of this study yielded only partial confirmation of the hypothesis. Siddiqi and Akhtar (1969), in their study of students, found the disciplined students to have a higher achievement motive and the indisciplined students to have higher affiliation and power motive than their counterparts. Using kindergarten children as subjects, Dave (1970) did not find any relationship between achievement motive and risk taking behaviour.

Mehta (1968, 1969a) studied the relative influence of achievement motivation courses and aspiration boosting programme upon the n-Ach development of teachers and students. Those who received both the programmes showed high n-Ach, followed by the those who had only achievement programme. Under-achievers with low socio-economic status also showed considerable improvement.

Mehta (1969b) recently reported two extensive studies—one on

the achievement motive in high school boys and another on the influence of motivation training programme upon individual growth of n-Ach. Employing a TAT-type instrument for measuring the n-Ach and an Achievement Motivation Inventory (AMI), he found that the n-Ach level in Delhi School boys seemed to compare favourably with the n-Ach levels of German and American boys, but it was lower than that of Brazilian and Japanese boys. No differences in n-Ach levels was observed when such variables as rural vs. urban, high vs. low socio-economic status and parental income were compared. Highest level of n-Ach was found among the boys whose fathers were highly educated and engaged in semi-professional work. The boys from the professional group showed nearly the lowest n-Ach. With education controlled, the working class boys showed a higher level of n-Ach than that shown by boys from the lower middle-class white-collar group. The subjects with high n-Ach and low motive to avoid failure tended to show greater performance at some competitive tasks of intermediate difficulty. In the other study devoted to examine the relative efficacy of Aspiration Boosting Programme (ABT) and Achievement Motivation Training (AMI), it was found that the boys whose fathers had low socio-economic status showed greater change in n-Ach than the boys whose fathers had middle socio-economic status.

Studies on Adjustment and other Variables

Roy-Chowdhury (1954) attempted to study the motives of life and their corresponding choices of freedom in a group of students. He found that choice of external freedom (political, social, religious and of speech) corresponds to the motive of self-expression and the choice of internal freedom (passions, thought) corresponds to the motive of self-restraint.

Sinha (1954) studied the level of aspiration and found it to vary in terms of the degree of frustration. Similarly, Muthayya(1960a) found the patterns of the level of aspiration to be related to frustration-reaction types. Muthayya (1963) and Abraham (1968) found the level of aspiration to be a general trait of personality, independent of tasks.

Joshi (1964) and Joshi and Singh (1968) reported factor analytical studies of adjustment problems. The results indicated inter-area dependence in adjustment and also pointed out that the severity of the situation contributes to different areas of adjustment.

Dhapola (1967) used Asthana Adjustment Inventory and MPI to find out the relationship between adjustment, extraversion and neuroticism. He found adjustment and neuroticism to be correlated

negatively, adjustment and extraversion positively and extraversion and neuroticism to be independent factors.

Sinha (1969), in an attempt to relate personality types to the level of aspiration, found extraverts to have a higher level of aspiration than the introverts. Rabindradas (1969a) studied 'adherence tendency' as related to level of aspiration. He found indi viduals having more 'adherence tendency' to be more consistent in their level of aspiration.

Kuppuswamy (1949) made a statistical survey of students' perceived preference of their parents in order to study prevalence of Oedipus Complex. The results yielded partial support to the Freudian conceptions of the complex. Dhuley (1965) in a study of masculine complex of girls found 49 out of 50 girls to have this complex.

Using tests devised by himself, Shanmugam (1957b) conducted a study to test the hypothesis that there are different levels of personality functions—covert and overt—and that these levels are opposite in character and function. The results revealed only the first hypothesis to be valid. Further, a third level of personality, viz., fantasy level was also found to exist in personality structure.

In another study, Shanmugam (1957c) found adolescents in families of low socio-economic status to have symptoms of excitability, anxiety, neuraesthenic tendencies and sleep difficulties. He found chronic presence of hunger, need for succorance and chronic frustration of the needs to cause emotional instability.

Using a projective test, Varma (1957, 1959) studied children's fears. She found age and sex differences to exist in the fear arousing stimuli for these children. This is partially corroborated in another study by Sidana (1967).

Parameswaran (1957) compared adolescents with adults on different personality variables using a number of tests. He found adults to be better adjusted in the areas of dependency on others, dominance, submission, sibling relationships and heterosexual relationship than adolescents. Hafeez (1958) studied emotional instability of college students and found obsession of ideas, self-consciousness, desire to steal or to set fire, asthma and loss of manhood to be important symptoms among them. In a similar study, Singh (1961) found the majority of adolescents to be troubled with problems concerning morals and religion and as high as 99 per cent of them preferred counselling. Another study by Mehrotra (1966) indicated boys to possess more problems than girls. A similar study by Kakkar (1967) emphasized the role of school in causing anxiety and problems of adjustment among adolescents. Nataraj (1968) found adolescent girls to be unsatisfactorily adjusted to the stress and strain of environment. Devi (1969), using Sinha's Anxiety

Scale on male and female students, found no difference in their anxiety.

Studies on Self-Concept

The concept of self is regarded as one of the main aspects of personality but very few studies have concerned themselves with this aspect. Deo and Gupta (1963) and Deo (1964) studied the self concepts of students entering different classes at the college level and found significant differences in self concept amongst these groups. In another study on self concepts, Deo (1965) found negative acceptance of a desirable trait to be easier for an individual than the positive acceptance of an undesirable trait. Pareek and Khanna (1960) studied attitudes towards self and others. The results revealed a strong relationship between attitude towards self and most liked persons and a low relationship between the attitude towards self and least liked persons. Another study of ego identity of students by Pandit (1965) showed adolescents to have greater agreement with those who mean most to them and least with those who mean least to them.

Mohanty (1965) studied the self ideal congruence of University students and found the social desirability to affect the results. Nandy and Mitra (1965) studied self image through Draw-A-Man Test. They did not find economic status to be a crucial determinant of self image.

In a study by Miranda and Mohan (1968) on the perceptions of an ideal self, Nehru and Shastri, it was found that a similarity exists between the descriptions of public images and ideal inferential selves of Indian and American subjects.

In his study of Engineering students' self concepts, Deo (1966) found them to be less maladjusted and consistent in their self-assessment. Similarly Pathak (1967), in a study of self ideal congruence and adjustment, found a positive relationship between the two. George and Mathews (1967) studied ideal self-concepts held by men and women and found the ideal self of a man to be courageous and free from vices and of women to be humble, loving and free from jealousy.

Extraversion, Neuroticism and Related Variables

Rakshit (1946) attempted to relate colour preferences to personality. The results showed extraverts to prefer deeper colours of blue, red and green and introverts to prefer orange and white. Mohan and Mohan (1967) found extraverts to be more influenced in their

aesthetic evaluation through knowledge of the authors than introverts. Saroja (1969), in her study of art appreciation in school children, found a slight positive relationship betweeen art appreciation and extraversion and no relationship between art appreciation and neuroticism. Mathur and Pais (1963) found extratensive students to show an optimistic attitude and intratensive students to lack confidence and to be pessimistic.

Malaviya (1969) found that extraverts evade aggression and react in a passive-threat oriented way and that neurotics are more aggressive. Simon (1966) found the relationship between emotional maturity and anxiety. Nataraj (1966) investigated the relationship between neuroticism and sex and failed to find any significant difference between the two sexes in neuroticism. In order to test the theory of manifest anxiety, Singh (1966) compared the examination grades of high and low anxiety subjects. He found a negative relationship between anxiety level and performance as shown by average grade points. This, according to him, is against the drive theory of manifest anxiety. George (1967) studied the relationship between order of birth and personality and found middle children to be more extraverted and slightly better in social adjustment. In a similar way, Reddy (1967) found the 'first borns' to be more maladjusted and the 'second born' to be least maladjusted. Sidana (1967) found girls to have more fears and no age differences in fear. Dutt (1968) related anxiety to age and socio-economic level and found no relationship between these variables. Pandey and Sinha (1968) studied dependency and found it related to adjustment problems perceived by individuals.

Muthayya and Mallikarjunan (1969) studied the relationship between humour and intelligence using a humour test devised by themselves. The results revealed an inverse relationship. In a comparative study of psychology and non-psychology students, Sinha (1967, 1968b) tried to find out whether personality has anything to do with curricular choice. He found no difference with regard to their anxiety, insecurity and neuroticism.

Ramamurthy (1969) studied the adjustment of a group of aged men and found poorly adjusted men to be more rigid, to have more negative attitudes and unsatisfactory adjustment in their past.

An attempt was made by Devadasan (1966d) to see whether susceptibility to bias in reasoning was positively or negatively related to the personality dimensions of extraversion/introversion on the one hand and neuroticism on the other. On the analysis of the results, susceptibility to bias in ratiocination, whether it be emotional or retentive, was found to have low and insignificant negative correlation with neuroticism and extraversion.

Dutt (1970) investigated the relationship between a number of variables like extraversion, neuroticism, anxiety and A-S reaction. The results showed anxiety and neuroticism to have high relationship, extraversion to be unrelated to A-S reaction, neuroticism and anxiety to have negative relationship with A-S reaction.

Das (1958a, 1958b, 1965) presents a theory of hypnosis in which he assumes hypnosis to be a form of conditioning and a state of inhibition. Hypnosis is viewed as a learned state of cortical conditioning and a multiplicative function of learning and inhibition. He holds 'hypnotisibility' to be relatively stable and a clear cut trait of personality (Das, 1964a, 1964b). Das (1969) has also attempted to evolve a memory model in terms of neurodynamics of extraversion-introversion. He suggests that activities such as rehearsal and encoding for long term storage interfere with recall, and that the introvert is much more seriously engaged in these at the time of short-term retrieval than the extraverts. Hence, he speculates that the extraverts may be better in short-term memory than the introverts.

Khalique (1966a) studied the reaction to guilt evoking situations in a group of students. He found anxiety, self-aggression, rationalization, shame and sorrow to be the frequent reaction. Pratap and Filella (1966) studied Rorschach correlates of anxiety and found anxiety to increase emotional reactivity to a certain extent. They found anxiety to have both motivating and disruptive effects. Sharma (1968b) studied the needs of pre-adolescents, using TAT. He found such needs as abasement, achievement and succorance to be greater in them.

Using questionnaires, Dixit (1964) studied the psycho-social aspects of tobacco smoking and non-smoking with specific reference to initiation of smoking. He found initiation of smoking to be a social and psychological phenomenon mediated by the mechanisms of imitation, curiosity, smartness, feeling of manliness, prohibition and parental permissiveness. The initiative factors of non-smoking were found to be fear of cancer, health hazards and other unfavourable attitudes towards smoking. Dolke (1969) studied the relationship between extraversion-neuroticism and cigarette smoking. He found smoking to be related to extraversion and not to neuroticism.

Socio-cultural Factors and Personality

Dhairyam (1956), in his study of Indians and Americans, found Indian culture to foster the feelings of affiliation, nurturance, defence and resignation and to minimize autonomy, achievement, dominance and aggression. He also found that the traits undervalued in the

Indian culture were regarded as virtues in the American culture.

Asthana (1956) has related personality characteristics, as revealed by the ink-blot test, with the nature of Hindu social organisation. Sharma and Chatterjee (1966) and Chatterjee (1969) found differences among Hindus and Muslims in Mosaic designs. Shanmugam (1957c) found significant difference among the boys belonging to high and low socio-economic families in emotional instability. The boys from low socio-economic group were emotionally more unstable.

Nijhawan and Gupta (1966) extended the frustration-aggression hypothesis to the caste-system. Using a projective technique, they found significant differences in aggression between 'High caste' and 'Low caste' children. Significant differences between rural and urban children were also noted. Shakeela Begum and Hafeez (1964) studied the value preferences as related to caste and religion. The results showed no relationship between these variables and value-orientation. Kapoor (1964b) found socio-economic status to account for differences in personality variables assessed through 16 P. F. Test.

Pareek and Chattopadhyay (1965b) studied the change proneness of farmers with a projective technique devised by them. They found farmers to be less change-prone in general. In another study, Rao (1966) found the level of aspiration and expectations of farmers to have a direct correlation with their age and income on the one hand and satisfaction derived by the past achievement on the other. In an intensive study, Sinha (1969) found motivation of the villagers to be largely centered around immediate problems of subsistence involving little risk taking.

Rao (1963, 1969) studied bilingualism and its relationship with personality. He found bilingual boys and girls to show more anti-social and withdrawal tendencies than monolinguals. However the bilinguals were not lagging behind in social skills and feelings of adequacy. In another study, Shanmugam (1965b) found bilingual girls to be more neurotic than monolingual girls. Sex differences were found in the effects of bilingual position on personality traits. Patel (1965b) found English-speaking nursery children attending English medium nursery schools to be better adjusted than non-English speaking children studying in the same type of school. Varma (1961) studied behaviour problems of school children and found socio-economic differences in them. Joshi (1965) used TAT and found certain personality differences in industrial and pre-industrial culture. In a study of rural and urban children, Varma (1966) found personality traits to vary with different socio-cultural status groups. In his study of workers, Veeraraghavan (1966) found that the need for achievement is greater among those who have exclusively lived in urban areas than among those who have recently migrated from

rural areas. He also found 'man-over-nature' and 'doing orientations' to be the predominant values among industrial urban communities.

Verma and Verma (1966) and Mohanty (1967) independently investigated the relationship between certain personality traits and different socio-cultural backgrounds, viz., urban and rural. They found no consistent results. Tiwari and Sultan (1967) have found that self-disclosure is related to the rural-urban differences. In another study, Varma (1967) investigated the influence of caste on the development of personality. Dixit (1968) investigated sex role consciousness of male and female subjects and found significant differences between upper and lower caste village groups. He also found age and sex to be important. Verma and Verma (1969) investigated the relationship between personality traits and socio-cultural status and found a positive relationship between the two.

Malatesha (1969) used TAT to find out the relationship between n-achievement, n-affiliation, n-power and socio-economic status in a group of college students. The results of this study indicate no significant relationship among the variables. In an experimental study using six colours, Saiyadain and Siddiqui (1969) verified the hypothesis that colour scaling on the basis of emotions can be a cultural phenomenon. Singh (1969) studied successful agricultural entrepreneurs and found them to have a high achievement motive than their unsuccessful traditional counterparts.

Mehta and Juneja (1969) studied the 'order of birth' in relation to vocational preference using data obtained from samples from the United States, Netherlands, and India. The results showed no relationship between birth order and vocational preference assessed on the basis of Roe's classification in terms of Field (Person oriented and non-person oriented) and Role (Parent Surrogate and non-parent Surrogate).

Studies of Leadership

Sinha and Kumar (1966) found student leadership to be related to anxiety and dominance and not to extraversion, neuroticism, adjustment, rigidity and ambiguity tolerance. In a series of studies, Kumar (1965, 1966, 1969) investigated the relationship between personality and leadership and found leaders to be lower on theoretical and aesthetic values and higher on social and political values. He also found age and caste to be related to leadership and that leaders lay a greater stress on the presence of frustrating obstacles than non-leaders.

In a study of students' sociometric choices, Sharma (1964) found negative correlation between anxiety and sociometric status. In

another study, Govindarajan (1964) found significant differences between leaders and non-leaders with regard to vocational preferences. Krishnan (1965) studied the personality of student leaders, identifying them by the 'L' scale of Mysore Personality Inventory. He found 'emotional-social adjustment' and 'realistic attitude', to contribute toward the development of leadership and pessimistic and delinquent tendencies to have a negative influence on leadership. Similarly, George and Abraham (1966a) found leaders to be better adjusted in health and social relations and to have better academic and curricular achievement than non-leaders. Tiwari and Gautam (1966) studied the personality problems of socially accepted and neglected adolescents. Ganguly (1967) found university students to be characterized by dominant theoretical, economic, social and political values. Bhushan (1969a, 1969b) studied leadership in relation to personality, using 'Leadership-preference Scale'. His studies have shown a negative relationship between preference of democratic leadership and authoritarianism. Further the results show a direct relationship among high ascendance, extraversion and emotional stability and preference of democratic leadership.

Sharma (1965b) studied prejudice among college students. He found the high-prejudiced group to be more extraverted and more neurotic than the low-prejudiced group. In terms of frustration reaction, high prejudiced group was found to be more extrapunitive than the low prejudiced group, which was significantly more impunitive. In a study of students, Jawanda (1961) found introverts to be more superstitious than extraverts. The results, however, did not reveal any difference in superstitiousness between neurotics and non-neurotics. Gupta (1969) found superstitiousness to be correlated positively with extraversion and negatively with neuroticism.

Dixit and Sharma (1970) studied student-teacher relationship in terms of value incorporation, using Allport-Vernon scale of values. Significant differences have been found between boys and girls and their male-female teachers. Greater differences were observed on political values between the two groups.

Studies on Authoritarianism and Related Variables

Choosing subjects from Delhi and Ohio State in U.S.A., Khanna (1958) compared accuracies and inaccuracies in social perception of authoritarians and non-authoritarians. Not a single non-authoritarian subject in Delhi showed up as either completely accurate or completely inaccurate in social perception. On the other hand, they all fell between the accurate-inaccurate limits. Singh (1961)

studied personality in terms of extraversion-introversion as related to conformity behaviour and found differences among the groups studied. Gupta (1963) attempted to relate authoritarianism to intolerance of ambiguity and found these variables to be related. Mittal (1965) studied personality differences between conservative and progressive women. He found conservative women to be introverted, submissive, neurotic and lacking in self-sufficiency. Majumdar (1966), Majumdar, Sarkar, Das and Roy (1966), in two independent studies, have found non-adoptive farmers to be introverted, resistant to changes, apprehensive and insecure.

Bhushan (1967) studied personal factors in authoritarianism using Hindi version of the California F-Scale. The results revealed that factors like education, economic status, age, caste, and sex are associated with authoritarianism. He also found females to be less authoritarian than males. Kanekar and Telerandhe (1967) investigated the relationship between authoritarianism and misogyny and found it to be insignificant. However, sex differences were found only in misogyny.

Mohanty and Singh (1966) studied the relationship of authoritarianism to a number of personality variables such as adjustment, anxiety, perceptual control, and abstract reasoning of a group of senior defence officers. Results indicated that authoritarianism was negatively related to adjustment and abstract reasoning and positively related to anxiety.

Raina (1970) made a comparison of personality attributes of high and low authoritarian individuals using California F-Scale and Edwards Personal Preference Scale. The results show that high authoritarian subjects have higher needs of deference, order, succorance, abasement and aggression and that low authoritarian subjects have higher needs of achievement, autonomy, intraception, change and heterosexuality. No difference was found between the high and low authoritarian subjects on needs of nurturance and endurance.

Experimental Studies

Sundari (1958) studied extraversion, neuroticism and time judgement. The results revealed no relationship among these variables and time judgment.

Shanmugam (1960) devised a test to study the relationship of voluntary inhibition and disinhibition to extraversion-introversion and neuroticism. He found significant negative relationship between inhibition and extraversion and positive relationship between inhibition and neuroticism. No relationship was found between disinhibition extraversion-introversion and neuroticism. Shanmugam and

Sundari (1960) tried the above experiment on delinquents and normal boys and found significant difference between them in disinhibition.

Paramesh (1961, 1963a) studied the relationship between extraversion and vigilance and figural after-effects. He found extraverts to be inferior in auditory vigilance and to have shorter duration of figural after-effects than introverts. Similar results were obtained by Paul (1964).

Das (1964a) attempted to relate auditory vigilance, verbal satiation and hypnosis to personality. He found (M.P.I.) E-I score to be correlated negatively with hypnosis and positively with rigidity. Das and Mitra (1965) investigated the relationship between verbal conditioning and personality types in terms of extraversion, neuroticism and rigidity. None of the personality factors were significantly related to verbal conditioning. These results were subsequently corroborated in another study by Das (1965).

George, Devadasan and Dharmagadan (1967) studied verbal conditioning and suggestibility using a number of objective behaviour tests and MPI. The results revealed a significant relationship between conditionability and suggestibility. Mohan (1968) studied the relationship between reminiscence and personality using 'pursuit roter' and MPI. He found both extraversion and neuroticism to be significantly related to reminiscence.

Gupta (1968) designed a study to explore the effects of personality variables of extraversion-introversion on persistence in mental task. The results indicated differences in extraverted and introverted groups. Srivastava (1968) found extraverts to be more susceptible to pressures of the informational group than introverts in autokinetic experimental situation.

Shanmugam (1965a, 1968) conducted experiments to find out the effect of severity of conflict on decision time and related this to personality variables of extraversion, introversion and neuroticism. He found that when the competing stimuli approached quality, the decision time increased and the accuracy of decision was affected (1968). There were differences among the personality groups in decision time (1965a) but not in the accuracy of decision (1968). Singh, Sharma and Kumari (1961) have found personality differences related to the fluctuation of attention and neuroticism to be a more important determinant of attention than extraversion.

In another study Mohan and Neelam (1969), using the personality types mentioned above, studied motivation and six determinants of reminiscence. The test used was inverted alphabet and the subjects were adults. They found, in induced motivation, differences in the reminiscence among the personality types. However, no sex difference was found in the results.

Studies in Learning

Rao (1954), in his experimental study of the effect of frustration on learning with delinquent subjects, found induced frustration to retard the progress of learning. In another study, Mohsin (1960) studied retroactive inhibition as related to ego threat. The results revealed some evidence to attribute inhibition to repression. Das (1962) studied learning under hypothetically induced anxiety. He found that the level of anxiety affects recall and learning.

Shanmugam and Santhanam (1964, 1965) studied interference of serial learning by presenting both bipolar and neutral stimuli at marginal visual level. They found both the stimuli to interfere in the efficient learning of the materials, bipolar stimuli doing this to a greater extent. They attributed this to the semantic habit system which is stronger in a 'meaningful word' than for 'neutral stimuli'. Purohit (1966) studied paired associate learning in his comparative study of Eysenck's and Spence's theories. The results supported Spence's theory rather than that of Eysenck. Mukherjee (1966) found fast learners to have a higher achievement motive than slow learners. In a study of maze learning, Nijhawan (1968) found stress to be highly detrimental in both the normal and high anxious subjects. Failure-stress proved to be most damaging to learning, next in importance being stress due to competition. Kothandapani and Reddy (1967) have studied incidental learning using cash incentives. They found high motivated subjects to be inferior in incidental learning than low motivated ones. In another study, Murthy and Reddy (1967) found low anxiety subjects to be superior in motor learning when step maze and mirror-drawing were used as experimental tasks. Mohsin and Akbar (1968) have found incidental learning to be influenced by the personality of the learner. In a study of sensory-motor learning, Singh (1968) found moderate level of anxiety to facilitate learning under this condition.

Sinha (1969b) studied the effect of demand condition on learning and found that they affect learning scores favourably and intelligence scores unfavourably.

Jha, Sinha and Prasad (1968) studied verbal learning under ego-oriented and task-oriented conditions as related to anxiety. The results showed ego-oriented, high anxiety subjects to be superior to task-oriented high anxiety subjects as well as to low anxiety subjects with task orientation. Ego-oriented low anxiety subjects were found to be superior to ego-oriented high anxiety subjects.

Rabindradas (1969a, 1969b) studied rigidity as related to learning, using associated type of learning which involved 'friction'. He found

rigidity, defined as 'adherence tendency,' to contribute to this type of learning.

Studies on Suggestibility

Das, Rath and Das (1955) conducted an experiment to determine the effects of prestige on the judgment of literary materials. They found that strengthening of the factor of understanding of the materials weakens the effect of prestige factor. Das (1960, 1965) studied the effects of prestige of the experimenter on the body-sway of the subjects. Among the two orthogonal factors of suggestibility, primary and secondary as distinguished by Eysenck, body-sway was classified by Das under primary suggestibility. Prestige was found to increase body-sway suggestibility and subjects high in suggestibility showed a significant increase in body-sway under the influence of the prestige of the experimenter.

Das (1963, 1964b) analysed the nature of Yoga and Samadhi (concentration) and found many points of functional and methodological similarities between them. Ojha (1963) found prestige suggestion to be related to personality factors of extraversion and neuroticism. In his study of ascendant-submission persons Sinha (1968) found ascendant individuals to be less amenable to prestige suggestion than submissive persons. Verma and Sinha (1969) studied the relationship between prestige suggestion and security-insecurity, using Slogan's list and Maslow's Security-Insecurity Inventory. The results revealed that change in attitude and opinion under influence of prestige-suggestion occurs more in insecure types than in secure ones.

Studies on Perceptual and Related Tendencies

In his study of reaction-time of schizothymic and cyclothymic persons using Krishnan's questionnaire, Sreekanta (1961) found schizothymes to show longer reaction-time than cyclothymes. In an exploratory study Faroqi (1962) has found a negative correlation between anxiety and decision time. B. Ray (1964) studied the effect of need achievement on perception using economically rich and poor boys and estimation of the size of coins of different values. The results showed a positive relationship between overestimation and underestimation of coins and intensity of economic need.

Chandra and Reddy (1965) found that high anxiety students tend to make more errors in estimating short temporal intervals. They also studied the effect of motivation and achievement on psychological time in rural and urban subjects, and found that highly

motivated subjects tended to underestimate time and the rural-urban variable did not produce any difference.

Roy and Sinha (1966) found anxiety levels to be unrelated to mental work. Kool and Pestonjee (1965) have studied reaction time as related to authoritarianism. They found the authoritarian subjects to show a shorter reaction time than non-authoritarian subjects, when the polarity of set is changed. Gupta and Prasad (1967) studied the effect of impending threat on temporal estimation. The results revealed that apprehended stress tends to make the subject to underestimate time. Gupta and Adya (1967) studied the effects of impending threat using the technique mentioned above. The results showed that estimation of the duration of time differed significantly in high and low anxiety subjects under normal conditions. Under expectancy set, stress brought out a decreasing trend in the estimations of time in low anxiety subjects under normal conditions. Under expectancy set, stress brought out a decreasing trend in the estimations of time in low anxiety subjects and an increasing trend in the high anxiety subjects.

An attempt to find out the relationship between figure reversals and behavioural rigidity was made by Ramamurthy and Ananthakrishnan (1967). The results revealed that frequency of figure reversals and psycho-motor speed were significantly correlated.

Meade and Singh (1967) and Singh (1966, 1969) studied urban and rural subjects on a letter concellation task. Fast progress subjects as well as highly motivated subjects estimated the time spent on the task to be shorter than did the slow progressive subjects and low motivated subjects. No rural-urban difference was found with regard to the time estimation.

Sinha (1968) has found high and low anxiety children to differ both in intelligence and neuroticism. Further, 'concept formation' and 'anxiety' were found to be significantly related, while 'intelligence' and 'anxiety' were not.

Roy (1964) studied the effect of need on perception. He found the effect of need to result in overestimation. Lakshmi (1967) studied the relationship between personality and perception, using the Personality Inventory of Shanmugam. She found emotionally unstable subjects (high school girls) to overestimate the size of the coins and discs more than the emotionally stable subjects.

Sharma (1968a) studied Word Association Test responses of psychoneurotics and normals and found reaction time and reaction context to discriminate between them.

Rabindradas (1969a, 1969d) studied the relationship between 'adherence tendency' (rigidity) and Muller-Iyer perception. He found individuals having more adherence tendency to have more accuracy

of perception than those with less adherence tendency. Similarly, rigid individuals were found to have a greater ability to shift to new concepts quickly than non-rigid individuals, when the requirement demanded them to have more plasticity in forming new concepts (Rabindradas, 1969a, 1969b).

Psychopharmacological Studies

Singh (1961) studied the effects of drugs, with stimulant and depressant action, on the acquisition of a conditioned emotional response, using rats as subjects. The results showed conditioned emotional response to be affected by 'central' rather than 'autonomic' drugs. Singh, Gupta, and Manocha (1965) designed a study to test the effect of drugs on personality variables and on physical persistence. The results revealed a positive relationship between persistence and extraversion and a negative relationship between persistence and neuroticism. It was further found that the depressant drugs produced an increase, and excitant drugs a decrease in persistence.

Muthayya (1966) studied the goal setting behaviour of neurotics under 'librium' (Chlorodiazepoxide). Under the influence of this drug, the behaviour was found to have deteriorating effect. In a study by Jain (1967) on the effects of drugs on illusory changes, introverts were found to show more illusory effects than extraverts and non-neurotics. The drugs used were phenobarbitone and dexedrine. In another study with rats by Mehrotra and Sood (1967), no relationship was found between emotionality and habit strength. The task used was water-reinforced-lever-pressing response and the drug used was chloropromazine. In his study of emotionally reactive and non-reactive rats, Rao (1968) found positive relationship between oxygen consumption and emotionality. In a study of personality and verbal conditioning under phenobarbitone, Gupta (1968) found personality to be affected by the drug, with no effect on verbal learning.

Personality and Academic Achievement

Krishnan (1960b) investigated the study habits of students as related to personality factors. He used factor analysis and found that factors identified as 'adjusted schizoid vs. maladjusted schizoid' and another factor having high loading on items such as 'mixing freely with others', 'preference for independence', 'optimism,' 'making friends easily', and 'trusting people', were associated with study habits.

Muthayya and Rajeswari (1968), in their comparative study of backward and normal children, have found backward children to be more extraverted. No difference was found in emotional instability and need for achievement between the two groups. Elizabeth (1961) found introverts to be superior in Mathematics and Social Studies, whereas extraverts were superior in science. Jamuar (1961) found adjustment in home and emotional and social adjustment as well as introversion to be related to academic achievement.

Misra (1962b) studied academic achievement of engineering students, and found the high and low achievers to differ in anxiety and neuroticism and not in intelligence. In another study, Misra (1962a) found the concept of ideal figure to differ among high achieving and low achieving engineering students.

Muthayya (1965) compared high achievers with low achievers in scholastic field. He found no difference between the two groups in intelligence, aspiration level, and frustration reactions. However, they were found to differ in the need for achievement. His results further revealed achievement to be negatively related to obstacle dominance among high achieving groups and ego-defence response among low achieving groups.

Narayana Rao (1964b, 1967a, 1967b) studied the relationship between academic achievement and adjustment. He found that adjustment problems were related to under-achievement in scholastic field and that problems of motivation hindered scholastic achievement. A study by Sharma (1964) relating anxiety to academic achievement, revealed a positive influence of anxiety on academic achievement. Similarly, Tripathi (1965) found academic success to be related to personality problems. Kanungo, Pande and Chaudhury (1965) studied the problems of teenagers in relation to educational achievement and found that adolescent 'worries' do not affect achievement.

George and Nair (1968) who investigated the relationship of academic performance of teacher trainees to personality found a positive relation between poor performance in practical examination and emotional instability. In another study, George and Abraham (1966b) compared students who were regularly promoted and those who failed in schools on a few personality variables. They found no difference between these two groups in 'extraversion' and 'neuroticism'. Devadasan (1966a) related extraversion-neuroticism to academic achievement. He found a low negative correlation between extraversion and achievement and a positive correlation between neuroticism and achievement. In a study by Sinha (1966), high-achievers were found to have low-anxiety, better health and emotional adjustment than the low-achievers. However, in another

study by Ali (1967), no difference was found between bright and dull children on behaviour problems. In a study by Ramakrishna Rao and Kanthamani (1967), scholastic achievement was found to be related to certain important factors of personality, identified by using Cattall's HSPQ. Mehta (1968) found achievement motive to be related to academic achievement. In a recent study, Gupta and Kapoor (1969) found persistence in mental task to be related to academic achievement.

Bhatnagar (1969) studied self-concepts of bright achievers and non-achievers and found a direct relationship between positive and negative self concepts and high and low achievement.

Personality Variables and Creativity

Studies on the relationship between creativity and personality are slowly gaining recognition in Indian setting. In her creativity studies, Phatak (1961) employed the Minnesota Non-verbal tasks of creative thinking and Phatak's draw-a-man scale and found that the creativity of school children had significant association with I.Q., but was unrelated to school achievement. Bhattacharyya (1956) studied the personality of proved artists and found their creativity to be related to a shallow feeling for life, high sensitivity and ability for playful, pre-logical thinking. His studies with painters (1960) show that those who are by 'nature' creative are introverted and that those who acquire creativity are extraverted.

Raychaudhuri (1962, 1963a) attempted a breakthrough in traditional creativity researches in this country by subjecting his creative group of musicians to a thorough psychodiagnostic testing and exhaustive clinical interview. The studied musicians, Raychaudhuri reports (*op cit*), are more distinctly marked by their emotional and temperamental characteristics than by the cognitive and motivational aspects of their personality. Using the Welsh Figure Preference Test (WFPT), Raychaudhuri (1963b, 1966c) has been able to evince that the artists, both incipient and mature, are characterized by a preference for, and tolerance of, perceptual ambiguity, stimulus complexity and structural openness. Raychaudhuri's further extensive studies (1965b, 1965c, 1966a) with expert-nominated creative artists identified them as aggressive, varied in affective life, sensitive to shifts in mood-tones, tolerant of frustrating experiences and exhibiting signs of intra-psychic conflict about Oedipal relationship. Their achievements were found to be determined by super-ego demands and by a need to satisfy narcissistic desires. Raychaudhuri (1965a) and Raychaudhuri and Ganguly (1964) sought to analyse and compare the biographical data of Indian and American musical

artists and found unhappy home environment, feelings of isolation, alienation and loneliness pointing to egocentricity, experience of parental discord as crucial factors in their lives. Paramesh (1969) found the creative high school students to be neither extraverted nor introverted and also to be neither high nor low in neuroticism and anxiety. On the other hand, he found creative individuals to be stable in personality organization and characterized by high theoretical and aesthetic values. Paramesh (1970) also reported that creative high school students were found to be low on economic values.

Sharma and Sharma (1969) subjected a group of artists and a matched group of non-artists to a TAT study in order to validate some of the traditional psychoanalytic hypotheses concerning the personality of the artists. They concluded that, as compared to non-artists, artists have a greater conflict with parents: their parents reject them more often and they have less affiliation with their parents. They are less overtly aggressive and have a greater guilt sense. Pramanik (1969) studied the creative writing of young children in terms of their imagination, sense of rhythm and balance, appreciation and self-expression through various media. Raina (1970) attempted to find out sex-differences among teachers in creative thinking ability and also endeavoured to determine whether such variables as experience were related to creative ability. Results indicated that, though females scored higher than the males, except on the originality factor, the differences between the sexes, except in originality, were not significant. The correlation between fluency and age was negative and insignificant, between elaboration and age positive (sig. at 5 per cent level) and between total creativity and age, positive and significant.

Attempts at relating creative performance to projection of movement on ink-blot or similar unstructured stimuli have been documented. Raychaudhuri and Maitra (1968) have found that the levels of creative performance correlate positively with the test-scores which measure movement projection or preference for movement responses. Raychaudhuri (1970b) also found that high Rorschach M-productivity was associated with creativity, femininity in males and with the female sex.

Personality and Occupational Choice

Rama Devi (1960) and Banerjee (1961) have found that teachers have some special traits of personality. Pal (1968b, 1970) studied students of professional colleges using Rorschach and found engineering students to be better adjusted than students of law

and medicine. Using the TAT, he (1968d) also found engineering students to score high on achievement and nurturance needs. In other studies (1968b, 1968c) he further found that engineering students have superior intelligence, creativity, good impulse control, high level of aspiration and practical mindedness. He also noted a tendency towards introversion in them. Rao (1966) applied the Maudsley Personality Inventory (MPI) to the students of arts, science, law, medicine and agriculture faculties, as well as to four professional groups, viz. clerks, engineers, nurses and teachers to bring out the salient personality differences among the different groups. While the female samples showed a higher neuroticism score, the engineers and science students were the least neurotic groups.

Sharma (1969) who tested the occupational choices of extraverts and introverts (women students) found that extraverts preferred administrative posts. Relating temperament of the students to arts and professional colleges, Krishnan (1969) found that students from professional colleges were of a mixed type. A study by Roy (1969) has revealed a relationship between the choice of journalism as a career and certain personality variables. The results showed self-preference, academic proficiency and special tendencies, and habits and instincts of combat, egoism and altruism and self-assertion to be the decisive factors in the choice of journalism. Pandey (1969) studied the personality determinants of the choice of a job in a sample of undergraduate students representing different faculties. He found significant differences in ranking of the jobs by the high and low extraversion groups as well as by high and low neuroticism groups.

Personality Factors in Industry

Sharma (1948) studied the adjustment problems in industrial workers. Santhanam (1965) studied samples of unemployed, underemployed and employed persons using Taylor Anxiety Scale, Mirror drawing and hand steadiness tests. He found under-employed persons to be characterised by greater anxiety than unemployed and employed and that their performance on the aforesaid tests were affected.

Kalanidhi (1965) investigated the problems of job satisfaction among women workers in industry. She found that workers with satisfactory social relations at home, better financial status and positive attitudes towards work were more satisfied than workers with financial difficulties, negative attitudes to work and unsatisfactory social relations. Mohanty and Mishra (1967) studied higher secondary teachers and service officers using California-F Scale. They found teachers to score higher in authoritarianism than the service

officers. Pareek and Chattopadhyay (1967) studied farmers and found the level of aspiration, achievement motivation and orientation to security to be important traits in them. George, Devadasan and Krishna Prasad (1968) studied groups of well-behaved and ill-behaved bus conductors, using a battery of tests including social intelligence and MPI. Significant differences were found between the two groups only in neurotic tendency. Using TAT, Broota and Broota (1968) studied a group of clerical personnel. The results indicated the majority of them to be high in general emotionality, depressive tendency, anxiety and ambition.

Majumdar (1968) studied the personality traits necessary for success in supervisory jobs in industries. He investigated the interest pattern of technical persons, using questionnaire method. The results revealed important personality traits like discipline, co-operativeness, patience, self-confidence, leadership, acceptance, clear thinking to be essential for success in supervisory jobs.

Kundu (1967b) attempted to study the personality pattern of pharmaceutical sales personnel. He found them to be emotionally stable, self-sufficient, extraverted, self-confident and dominant.

Ganguli (1967) studied textile workers and found the incidence of psychoneuroses in this sample in India to be similar to the incidence rate in other countries. He also found poor job-satisfaction to be associated with mental illness.

Using Ladder Scale and EPI, Muthayya (1969) studied personality pattern of administrative officers. He found officers to be introverted and emotionally stable.

Studies on Delinquents and Criminals

Shanmugam (1965a, 1969) conducted a series of studies on the personality aspects of delinquents. Using his 'Personality Inventory' he found delinquents to be more emotionally unstable than non-delinquents (Shanmugam, 1953b). Similar results were obtained in a series of studies on sex delinquents by the same investigator (Shanmugam, 1956c, 1958b). Delinquent girls' fantasies were found to be characterized by themes of separation and rejection, altruism, anxiety and guilt. In another study, Shanmugam found delinquent boys to react aggressively to stress situations as compared to normal boys who manifested anxiety under similar conditions (1955a, 1957a, 1957c). It was found that delinquents generally manifested hatred, rebellion, violence, suicidal tendencies, insecurity, and a sense of failure in contrast to non-delinquent boys who manifested traits of hope, courage, confidence and faith.

Shanmugam and Sundari (1960) compared delinquent boys with

normal boys in 'inhibition and disinhibition', using a Word Association Test. They found delinquent boys to be lacking in disinhibition (the ability to break a set of habits already developed) as compared to the normal boys. In another study by Shanmugam and Govindarajan (1967) on 'motivational rigidity', it was found that delinquent boys were characterized by greater rigidity than the non-delinquent boys. Rajeswari (1967) studied the level of aspiration pattern of delinquent boys using Rotter's level of aspiration board. She found no difference in the overall performance of the two groups. However delinquents were found to have greater rigidity and less goal tenacity than the normal boys.

Rajangam (1957) studied various problems of sex delinquent girls and prostitutes. She found low intelligence, maladjustment in the areas of home, emotion, society and health to influence delinquency and prostitution. Singh (1960) studied the different factors associated with truancy. He found truancy to be associated with the absence of parents, especially father, and educational backwardness.

Mukherjee (1968) studied the personality characteristics of a group of criminals with the Rorschach, Szondi and a semi-structured biographical interview. The criminals, as opposed to the control subjects, were found to be characterized by an id-dominated impulsive pattern, a weak ego and a defective super-ego structure. Basically egocentric, the criminals judged things only by their personal standards. They were found to show signs of intra-psychic conflicts emanating from the Oedipal stage. Such other variables as aggressive tendencies, feelings of insecurity, poor self-concept, feelings of guilt and paranoid ideas were found among the criminals.

Majumdar and Roy (1962) studied four groups of delinquents in terms of their offences: theft, sex, liquor consumption and petty offences. They found differences amongst the groups in emotional stability. Ray (1963) studied groups of juvenile delinquents on Rorschach Test and found them to give high percentage of animal (A) and low percentage of movement (M) and whole (W), responses. Mukherjee and Maitra (1966) who studied delinquents with the Rorschach found them to give comparatively less *M* and *FM* and more *m* responses than the normal subjects.

Studies of Muthayya and Bhaskaran (1964) and Govindarajan (1966) revealed order of birth and position in family to be associated with delinquency. Ganguly and Maitra (1966) were able to relate the parental role and family dynamics to the inadequate socialization of delinquent children.

Mukherjee, Raychaudhuri and Maitra (1969) examined the impact of father-absence in early childhood upon personality functions and resulting criminal behaviour in a group of criminals with the help

of biographical interview, Rorschach, Rosenzweig P-F test and a personality inventory. Findings revealed that personality development depends more on the total personal-social situation rather than on any isolated variable such as father-absence or presence.

Chauhan and Dixit (1965) studied delinquents and found that those delinquents who had been truants were characterised by home-involvement, Oedipus feelings, and insecurity. In another study, Pati (1966a, 1966b) who investigated the personality traits of delinquents, found delinquents to be aggressive and in a pathological condition possessing neurotic and psychotic symptoms. Mathur and Kumar (1967) studied delinquents, using Children's Apperception Test. Their results showed delinquents to be more aggressive, authoritarian, dominating, acquisitive and less active, as contrasted to normal boys. Maitra, Mukerji and Raychaudhuri (1967) found the delinquents and criminals engaged in artistic creativity to be different from their non-delinquent counterparts. In his study of recidivists, Sharma (1969) employed the Rorschach and the colour Pyramid Test and the results indicated significant difference between the habitual and first offenders.

Kalpagam (1969) studied the basic factors of truancy, using her 'Truancy-Proneness Scale'. The factors of sex, socio-economic status, poor academic record, leniency of parents, severe punishment by teacher and the like, were found to contribute to the truancy-proneness of the children.

Rath and Pati (1969) investigated the personality traits of juvenile delinquents, adult criminals, and normal juveniles. They found juvenile first offenders and recidivists to be more neurotically prone than the other two groups.

In a Rorschach study of the convicted and incipient delinquent juveniles, Raychaudhuri and Maitra (1965b) found that, as compared with the equated normals, the most marked differences were in W, D, Dd, S, F+, F−, M, FM, colour, FK and K responses.

In another comparative Rorschach study, Raychaudhuri, Mukherjee and Raychaudhuri (1969) examined the protocols of undisciplined boys and matched normals and found that such determinant categories as absence of *M* and content categories as blood, mutilated animals/persons, frightening objects characterized the aggression-dominated protocols of the indisciplined subjects.

Mukherjee and Kundu (1961) studied the birth order and family positions of the criminals. They found order of birth to be related to different types of crimes. A study by Murthy (1966) on the personality of criminals using Krishnan's 'Cyclothyme-Schizothyme Questionnaire' revealed that cyclothymes are more prone to crime than schizothymes. It was also found that the majority of the

criminals tended to be ambiverts. In his studies of criminals and non-criminals, Singh (1967a, 1970), found no significant differences between the groups in neuroticism and extraversion and in self-concepts. Majumdar and Mukherjee (1969) conducted a study of criminals using Rorschach Test. Factor analysis of Rorschach ratios of these criminals yielded four factors, identified as 'Depth vs Breadth of Psychological Responsivity', 'Affective vs Organizational (cognitive) Maturity', 'Organized (planned) vs Spontaneous (impulsive) need satisfaction' and 'Index for Tolerance under stress situation'. Singh (1967b) and Sinha and Singh (1968) studied the self concepts of criminals and found criminals to have a lower self-esteem and social-esteem than non-criminals. Further, the criminals were found to have higher social conflicts than non-criminals. Raychaudhuri, Maitra and Raychaudhuri (1968) examined some of the social-environmental correlates of indisciplined behaviour. They found that such variables as crowding in home, uncomfortable home condition, poor family discipline and parental discord predominate the early life of the indisciplined subjects.

Studies on Maternal Behaviour

Boaz (1968) made an intensive case-study of fantasies in children. He found step-children to be in a psychological condition liable to develop behaviour problems because of the frustration caused by the death of their mothers and anival of step-mothers. In his study of step-children, Khalique (1966b) found them to be characterized by a greater amount of insecurity feeling and anxiety than children with mothers. Patel (1965) studied the relationship between maternal care and personality, using the test developed by her. She found that maternal care influenced the personality of the child a great deal.

Faizunnisa and Parameswaran (1967) studied the different ways of maternal behaviour and their effects on behaviour problem in children. The results indicate a positive relationship between the pattern of maternal behaviour and children's behaviour problems.

Studies on Orphans and Physically Handicapped

In his study of orphans, Dasgupta (1952) found that the wish to love and wish to be loved have not been sufficiently separated in them. Singh and Akbar (1970) studied orphans using CAT. They found orphans to be aggressive, full of anxieties and conflicts. Maitra and Banerjee (1967) employed the TAT and an intensive clinical interview to examine the constellation of intra-family dynamics and

thematic phantasies in case of institutionalized "neglected" adolescents engaged in homosexual practices. The experimental subjects significantly differed from the controls in respect of parental position, parents-child and child-siblings relations. Such dominant feelings as depression, anxiety and aggression, and such other intra-psychic determinants as sex-role, self-content and social set differentiated the experimental subjects from the normals. In another investigation, Majumdar (1963) studied deaf children. The results revealed that deaf children are more introverted than normal boys.

A comparative study of family-reared and orphanage-reared girls was made by Khatri (1965). Family-reared girls were found to have higher, yet more realistic aspiration than orphanage-reared girls. Further, the family-reared girls had professional ideals and a lesser number of friends than the orphanage-reared girls. The personality traits of orphans have been studied by Prakash and Saran (1966) also. They found orphans to be characterized by feelings of insecurity, inferiority, and hostility towards society. In another study, Bose and Banerjee (1969) investigated the personality of institutionalized handicapped children, using CAT. The results showed handicapped children to be passive and withdrawn.

Studies of Abnormal Personality

Irene Manual (1950) studied cases of problem children and found that the relation between achievement and ability of the pupils at school and their general intelligence level was related to behaviour problems. Even educated parents and teachers were found to lack a sound knowledge of mental hygiene principles.

Das and O'Connor (1959a) compared paranoid schizophrenics with non-paranoid schizophrenics on suggestibility and verbal conditioning. Paranoids showed greater 'body sway' than their non-paranoid counterparts. With regard to verbal conditioning, it was found that the difficulty of inhibiting an already acquired response was positively related to the amount of sway produced by suggestion. In another study (1959b), the same investigators failed to confirm the Pavlovian hypothesis that paranoid schizophrenics would show a greater tendency to inhibition than non-paranoid schizophrenics. In a study of the parents of schizophrenics, Chatterjee (1961) found mothers of schizophrenics to be unhappy and insecure, and to possess dominating, overprotecting and neglecting attitudes toward their children. Fathers of these schizophrenics were also insecure, weak, and unimportant figures in the family.

Hazari (1960), and Hazari and Sinha's (1961) study of depressives revealed that depressive symptoms and character traits as assessed

by the subjects themselves were inter-correlated, that depressive pattern itself consisted of more than one independent factor, and that depression as a symptom was a characteristic of all neuroses.

Das (1961) studied body-sway suggestibility of mental defectives and found that the defectives did not differ in their mean sways from each other when taken according to the grades of deficiency. Nor did the differ, as a group, from the normals.

Administering Rorschach Test, Kumar (1961b, 1962a) found significant difference between normal and depressive groups on all the variables.

In a study by Sastry and Ramachandra (1960), it was found that schizophrenics with suicidal tendencies revealed more aggressive behaviour than the simple schizophrenics. They used TAT pictures with aggressive themes.

Venkataramaiah (1964) investigated the effect of anxiety state on certain aspects of mental-motor coordination in mental patients using Manifest Anxiety Scale and tapping test. The results revealed neurotics to be characterized by more anxiety than psychotics and normals. It was also found that anxiety mediates and brings about measurable disturbance in mental motor coordination and seems to be responsible for greater intra-individual variance with reference to coordination.

The same investigator made a study (1965) of the influences of anxiety and pathological involvement on the perceived self and the ideal self in mental patients, using matched samples of normals, neurotics, and psychotics. He used thirty selected items from Taylor's scale as the measure of anxiety. The results indicated that loss in congruence is associated with anxiety and pathological states.

Agrawal's (1965) study revealed that psychotics express more internalised aggression. He considered masturbation anxiety, suicide and rationalization as internalised forms of aggression.

Devadasan (1965) verified and confirmed the hypotheses that abnormal persons differ from the normal quantitatively rather than qualitatively, and that diagnoses used in English culture could be effective in Indian (Malabar) culture also.

Mathew (1965) studied delinquent and asthmatic cases and found them to have basic similarity in their personality structures.

Misra (1969) studied normals and psychiatric patients using Maslow's Security-insecurity Inventory. He found significant differences in insecurity between these groups. The other factors found to be important in psychiatric patients were rural inhabitation and low income status.

A study of mental disorders by Singh (1969) revealed no relationship between mental disorders and religion. It was also

found that low status group had a greater incidence of extreme aggressive or withdrawal behaviour and an earlier onset of mental illness than higher status group. Dosajh (1968, 1969) studied the impact of counselling on adjustment. He found counselling to have positive impact on adjustment and building up confidence.

Personality Variables and Para-Psychology

Indian psychologists have investigated parapsychological phenomena at the theoretical and experimental level. Rao (1965a), employing the Manifest Anxiety scale, found that the high anxiety subjects obtained significantly more ESP scores than the low anxiety subjects. Rao (1965b, 1966) and Rao and Sailaja (1968) have discussed the theoretical framework for differential response and its bearing of the personality structure of the subjects in bi-directionality of PSi.

Bhadra (1966) explored the effect of the subject's attitude towards ESP on his scoring on the one hand and the relation between ESP and somato-types on the other. He found extremely significant differences between the ESP scores of the subjects who believed in the possibility of ESP and those who did not believe in such a possibility. He found no significant relation between ESP and somato-types.

Kanthamani (1966) studied the relationship between personality and ESP. She found no relationship between the subjects' ESP scores and their scores on Allport-Ascendance Submission Scale. In another study, Kanthamani and Johnson (1967) found a significant relationship between the subjects' scores on Krogg's defence mechanism test and their ESP scores.

Employing the High School Personality Questionnaire of Cattell, Kanthamani (1968) found that neuroticism and extraversion are related to the subjects' ESP scoring. The extravert subjects scored significantly better in ESP tests than the introverts. She further found a highly significant negative correlation between the subject's neuroticism and ESP scores.

Summing up

It may be seen from the foregoing review that it was in the post-war period that personality research progressed considerably. But this is an international trend which is not peculiar to India. In the last two decades, researches in this area have become more scientific. This is a healthy sign. At the same time, when we look for significant contribution from Indian psychologists, we are rather

disappointed, since most of the studies reported are based on western models.

There is often an uncritical acceptance of techniques used in the West. Just translating a questionnaire into a language of the country does not, by itself, prove its validity or reliability. Two inventories which have been extensively used are the MPI and the EPI of Eysenck (Shanmugam, 1960; Elizabeth, 1961; Das 1961; Banerjee and Mallik, 1962; Jalota, 1964; De, 1966; Singh, 1966; George and Abraham, 1967; Muthayya, 1968, 1969; Bhushan, 1969a; Parmesh, 1969; Kanekar, 1969; Prabhu 1970). There have been contradictory results from this test. This is understandable because of the cultural factor involved.

Studies of achievement motive in the line of McClelland have been prolific. (Shrivastava and Tiwari, 1967; Sinha, 1967, 1968; Mehta, 1968, 1969a, 1969b; Muthayya, 1967, 1968; Muthayya and Rajeswari, 1969; De and Khan, 1969; Tamhankar, 1969; Siddiqi and Akhbar, 1969; Dave, 1970). In a country like U.S.A. generating a higher level of 'need gratification' (using Maslow's hierarchy scheme), these studies have meaning. But in a country struggling at a lower level of existence, studies of security or affiliation motivation would probably have been more appropriate.

In almost all the researches, there is no evidence of underlying theory, though instruments adapted from the West, namely, Cattell's 16 P.F., Taylor's Manifest Anxiety Scale, Maslow's Security-Insecurity, Allport's Value-Scale or Eysenck's MPI and EPI etc. are based on a definite theoretical background. Often the results of Indian studies stand aloof without any direction and goal. What is strange is that there is no discussion of rationale behind choosing instruments. At the best, Indian approaches may be labelled as 'eclectic'.

Possible Fields of Further Research

Fundamental research using animals is sadly neglected in this country. India has varieties of fauna for the study of animal beha viour, particularly monkeys and apes. It is needless to say that the knowledge of animal personality definitely helps us in understanding human personality. Studies of emotionality by Evans and Hunt (1942) and Broadhurst (1957a, 1957b, 1958a, 1958b,) and of frustration by Maier (1949, 1956) and others are classical examples.

A few studies have been made in this country in the area of psycho-pharmacology. But they are not adequate. India has varieties of flora and a hoary tradition of medicine. These may be profitably used to develop studies. Knowledge in the areas of physiology, biochemistry, neurology, etc. is important. It would be desirable

to modify our M.A. courses in psychology suitably to provide elementary knowledge in these areas. The University Grants Commission's report has already touched upon this aspect (1968).

Researches under simulated conditions have not been attempted so far, there being only one instance, (Das and Bhattacharyya, 1964). Recently experiments on sensory deprivation (Freedman *et al.*, 1961; Goldberger and Holt, 1961; Kitamura *et al.*, 1963, 1964, 1965a, 1965b) and simulated researches in space travel, etc. have been done in other countries. Probably the Defence Science Organization which can afford the necessary finances and personnel, can undertake this kind of research. A few universities may also be called upon to undertake research in these areas.

Questionnaire techniques should soon be replaced by more precise and reliable instruments. The behaviouristic model is more appropriate for future research than the psychoanalytical model. But this does not mean that psychoanalytical model is not fruitful. So long as psychoanalytical concepts lend themselves to experimental control, they need not be ignored. Dollard *et al.* (1939), Dollard and Miller (1941, 1950), and Miller (1944) have set examples in this area.

Psycho-technology is another important area which is ignored in our country. But for sophisticated telescopes and microscopes, the knowledge of our universe would have been far less. Instrumentation should precede research in the field of personality. Future researchers in the area should keep physics and physiology as model sciences to follow. Researches in experimental neurosis (Sen, 1961) and psychosis have not been attempted at all in this country, save for one study (Shanmugam, 1965a, 1968). Examples set by Pavlov (1955) and Liddell (1944) may be fruitfully followed.

Researches on the structure of personality is necessary. To begin with, verification of contemporary theories of the West may be attempted. In the long run, some of the ancient Indian concepts of personality may be empirically verified.

Other areas in which researches could be attempted are personality and altered states of consciousness, development of personality, and personality and creativity.

The immediate concern, from a pragmatic point of view, should be to study the effect of nutritive, social, and cultural deprivation upon personality, personality and its response to innovations (e.g., family planning), personality of delinquents and criminals and specifically, personality of persons attempting suicide and murders.

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8

Physiological and Comparative Psychology

A Trend Report

By

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Introduction

Social Scientists face the challenge to resolve the apparent conflict between the biologist's warning that man is not a pawn in the chess-board of environment and the reformer's proclamation that the forces of environment far surpass anything which the hereditary equipment of mankind can do. The first statement asserts that differences among men are due to germ cells from which they are born and the second postulates that all healthy individuals start out equal. One of the chief techniques that social scientists may use in resolving this conflict is the comparative method which conforms to all the rigours of scientific experimentation and affords opportunities for testing the relative importance of the physiologically given and the environmentally acquired through systematic comparison of characteristics of different species to ascertain likenesses and differences. The similarities, as well as the differences, revealed by the comparative method are interesting and important because they provide new theoretical insights into the problems of causation, function and evolution of behaviour. "If we are ever to have a comprehensive theoretical psychology", says Harlow (1953), "we must attack the problems whose solution offers hope of insight into human behaviour." Nevertheless, one has to keep in mind certain principles while applying this method to the human species for making significant observations. Both the behaviour of the experimental animal and the corresponding human activity must be so well known that we can be sure we are working with identical phenomena.

The efficacy of the comparative method in the understanding of human behaviour was recognized when Darwin's theory of evolution presupposed a continuum in the phylogenetic development of animalia, and placed emphasis on the idea of progressively improved adaptation as a key to survival and reproduction. Adaptation is largely accomplished through behaviour which increases in levels of complexity with species of the higher phylum. However, the phylogenetic continuity permits treatment of infra-human behaviour as descriptive of the rudiments of human behaviour. Animal behaviour thus becomes a very useful yardstick for human behaviour.

Behaviour does not exist in a vacuum. It has a neuro-physiological basis. We designate as behaviour those complex motor acts of animals and men which allow the organisms to adapt to different environmental conditions for the purpose of satisfying their needs. A physiological psychologist accepts a behaviour theory which assumes that a stimulus (physical or physiological) causes a response, that a stimulus is always a change, that a response is an attempt to adapt to the change, and that a biochemical-cum-neurological make-up intervenes between stimulus and response. On the basis of sameness in the processes of the body economy, he further postulates that almost all behaviour can be analysed in these terms and that this forms a foundation for the more complex analysis of the cause and effect of human behaviour. Donaldson (1924) opines that "the similarities between the mammals bearing the same food habits tend to be close and that in some instances, at least by the use of equivalent ages, results obtained with one form can be very precisely transferred to the other". However, extreme caution needs to be adopted in making such a generalization, as its validity and depth depend upon the closeness of the phylogenetic relationship between the species compared.

The comparative approach permits two levels of analysis—behavioural and physiological. At the behavioural level, we study a number of species with respect to their adaptation to similar environment. It is extremely advantageous that complex behaviour patterns, which have been elaborated after a long evolutionary history, be studied first in a relatively primitive and uncomplicated form. Such a comparison for investigating the evolution and function of behaviour is the subject-matter of animal psychology. However, prediction of behaviour with given antecedent conditions is not the sole aim of behaviour analysis. An activity may be seen as contingent upon environmental stimulation. But such an analysis does not throw light on the contributions of the underlying mechanisms in eliciting that activity. The organization of behaviour needs to be understood also in terms of the physiological organization it reflects. This is

the task of physiological psychology which aims to investigate the physiological intermediaries that make prediction of behaviour possible.

The task of reviewing the research undertakings in these sub-fields is handicapped by the meagreness of research reports available in our country. This paper is therefore based upon whatever information was made available through the courtesy of Indian workers. It deals with the following topics under the sub-fields of Animal and Physiological Psychology:

Animal Psychology:—Comparative psychology; Natural observation; Early experiences; Instincts; Motivation and Emotion; Learning-conditioning, discrimination, avoidance and escape, reinforcement-schedules, punishment and extinction; Social and Sexual behaviour; and sensory processes.

Physiological Psychology:—Neurology; Brain lesions; Brain stimulation; Electrical activity; Sensory physiology; Biochemistry-hormones, drug effects—human, drug effects—animal; Cardiovascular processes; Environmental stress; Genetics; Personality correlates; and Nutrition.

Comparative Psychology

In a theoretical note, Shukla (1968) emphasized the need for conducting behavioural studies on infra-human subjects as studies on human subjects fail to conform to rigorous experimental design. Studies of controlled observation can be made more effectively with animals and their results can be taken as rudiments for humans.

I. Natural Observations

Parkash (1958) studied the behaviour of certain mammals towards snakes and, in a series of six experiments on the reaction of mammals, observed alarm and panic as significant reactions. Southwick *et al.* (1961a, 1961b) conducted a population survey of the rhesus monkeys in villages, towns and temples of northern India and reported transportation routes as well as forest areas for them. Singh and Manocha (1966), studying the reactions of rhesus monkeys and langurs in novel situations with the help of vocalization, reported that rhesus monkeys expressed more fearful responses than langurs and that langurs were also manipulative, active and less fearful. The differences between them were both qualitative as well as quantitative.

II. Early Experiences

Chakrapani (1967) studied the effects of two levels of anoxia

as infantile stimulation on later adults behaviour development. Stimulation was made (i) at birth, (ii) one week after birth, (iii) two weeks after birth, and (iv) three weeks after birth. Body weights, water consumption and mild deprivation, learning and retention, discrimination, conditioning, emotionality and response to stress were used as parameters. It was observed that infantile anoxia reduced emotional reactivity in adulthood and adult behaviour was also influenced by reduced emotionality and anoxia impairment giving rise to 'S' shaped curve.

III. Instincts

No significant study has been reported.

IV. Motivation and Emotion

Kuppuswamy (1929) conducted a study on hunger vs. escape as motives in learning. Davis (1966) reported a study on the motivation for cannibalism and other behaviour in the wasp *Ropodidia Variegate*.

V. Learning

Kuppuswamy (1942) reported a study on the learning of a W—type water maze by a dull rat. Chakrapani and Rammurti (1966) showed that there existed significant correlation between the quickness of conditioning and facility of discrimination and interpreted the results in terms of conditioning-extinction theory.

The discrimination learning in langurs and rhesus monkeys has been reported by Manocha (1967). Cognitive behaviour of rhesus and langurs was compared on the tests of visual pattern and object discriminations. Langurs were found significantly superior to rhesus monkeys in both the tests which suggests a higher phylogenetic rank for langurs.

Paul (1967b) differentiated nervous, weak and strong rats on the basis of open field and escape avoidance behaviour. Rahman (1963) reported experiments to determine the role of escape in exploratory behaviour on a Dashiell maze under conditions of (i) stimulated fear, (ii) light factor, and (iii) real escape. It was found that much of the exploratory behaviour of albino mice is more due to necessity rather than to curiosity in an experimental situation.

VI. Social and Sexual Behaviour

Singh (1963) studied the effect of human contact on rhesus monkeys in India. By comparing the urban and forest groups of monkeys, he

found that the urban group was more aggressive and communal within the group than the forest group. The urban group monkeys were also more responsive to novel objects and situations. This suggests that the kind of environment in which the urban groups lived had a considerable effect on their social and emotional behaviour. In a later study, Singh (1966) reported the effect of human environment on the cognitive abilities of rhesus monkeys. Tests were made on visual pattern discrimination, object discrimination, 3-object discrimination of oddity type, weight oddity discrimination and pattern string tests. Both the urban and forest monkeys were found almost equal on the above tests which shows that environment has no effect on the cognitive abilities.

Manocha (1968a, 1968b) studied the effect of age on the behaviour of rhesus monkeys in respect of reaction to novel situations and objects and free social behaviour. Two groups of monkeys with considerable age-differences were studied and it was found that the two groups differed mainly with regard to the tendency to indulge in typical stereotyped behaviours in facing novel situations and objects. Significant differences were observed in individual and social behaviour also. The youngsters were more tolerant whereas adults fought severely. Youngsters also spent more time in individual activities and the adults in social activities. A well established dominance hierarchy was also observed in the adults.

Narda (1966) reported the significance, nature and extent of various stimuli involved in courtship and mating behaviour in *D. Malerkotliana* (Sophora Drosophilla). The stimuli provided by vision, tapping, wing vibrations and licking/smelling appeared to be of great importance, individually as well as additively. Paul (1967a) reported a study on sex differences of rats in open field behaviour. Each rat was placed for 10 minutes in the open field, one half of which had just been occupied by another rat for 5 minutes. No significant preference or tendency was noticed to spend more time on either side. The males spent significantly more time on the side where females were placed earlier, while females spent more time on the side which was unoccupied earlier.

In another study, Narda (1968) reported on the stimuli involved in sexual isolation among sophora drosophilla. It was observed that elimination of tapping or smelling, which are responsible for recognition and sexual drive, decreased the sexual isolation.

VII. Sensory Processes

Mukherjee (1934) reported a study on the reaction of gold-fish to colours.

This list of researches shows how meagre is our research in comparative study of behaviour. This is, however, understandable because, in a majority of Indian Universities, psychology has received formal recognition as a separate branch of discipline within the last decade only.

To give some impetus to the studies in this field, it is suggested that the study of evolutionary adaptations of different species of animals as a pre-requisite to the understanding of human behaviour, should be incorporated within the curriculum of psychology in all universities where the subject enjoys independent status. This will facilitate requirement of researchers having a regular orientation to this profitable field of investigation.

Physiological Psychology

The teaching of physiological psychology within the psychology departments of Indian Universities has received comparatively wider recognition. The available research data in this field is briefly summarised below.

I. Neurology

No work has been reported.

II. Brain Lesions

Anand and Dua (1955a, 1955b, 1956a, 1956b, 1956c, 1956d) and Anand, Dua and Chhinna (1957, 1958) have reported significant studies on the autonomic changes following amygdalectomy in monkeys.

Sinha *et al.* (1970) have reported a study on the cortical correlates of weight discrimination ability by albino rats in a string-pulling apparatus. In this investigation, lesions were made on the basis of Woolsley's macromap of rat brain in somatic area I and II in right and left hemispheres, both unilaterally and bilaterally. After recovery, rats were subjected to various weight discrimination tasks from easier to complex ones. It was observed that somatic area I is more important in somesthetic habits. Lesions in somatic area II produced significant retardation in comparison to control subjects. Laterality was evidenced in somatic area I and bilateral damage impaired performance more than unilateral damage. The study is important as it provides additional information hitherto unreported about the definite loss of performance with lesions in somatic area II. This is ascribed to the preciseness of Sinha's 'Weight discrimi-

nation apparatus by string pulling' and the complexity of somesthetic involvements for the kind of weight discrimination investigated.

III. Brain Stimulation

Pal and Singh (1965) reported that sound vibration causes disturbances in the neurophysiological control of behaviour.

IV. Electrical Activity

Majumdar, *et al.* (1964) reported a study on the prognostic evaluation of alpha-responses in epileptics with or without psychological disorders. Dey, *et al.* (1967) conducted a study on encephalographic characteristics in abnormal brain functions. On the basis of EEG tracings of schizophrenics, mentally deficients, delinquents, psychopaths and mongols, two types of physiological defects, maturational and cleavage in cortical and sub-cortical feed-back system, were discovered to be responsible for the impairment of the normal learning process which, in turn, gives rise to behavioural disorders.

Bose and Banerjee (1966) reported a psycho-galvanoscopic study into the reported emotions of University students. They obtained significant differences among concomitant changes in resistance during different emotions, viz., startle, anger and fear.

Chhinna, *et al.* (1968) found that genital stimulation of sexually immature male and female monkeys could produce no specific EEG changes excepting generalized arousal. Chronic testosterone treatment with male group also yielded the same result. But genital stimulation following such treatment gave rise to high voltage, low frequency waves, mostly in the rostral hypothalamic region. In the case of the female group, chronic estrogen treatment started producing spontaneous spindling in the rostral hypothalamic region which spread to other regions later. Genital stimulation after even the first extrogen injection produced spindling in preoptic area.

V. Sensory Physiology

Mukherjee (1966), in an experimental study into the phenomenon of protovision, attempted to examine the possibility of facial skin reacting to light. Ten groups of persons with categories against age, sex, skin pigmentation and blindness served as subjects. Positive results have been reported in most of the cases suggesting that facial skin reacts to light.

VI. Biochemistry

Rajalakshmi, *et al.* (1965a) reported that lower enzymatic activity and GABA affects visual learning of albino rats. It was suggested that the concentration in the cerebrum of certain enzymes as well as of amino acids like glutamic acid, GABA, aspartic acid and alanine were possibly responsible for lower scores on visual learning. Dey, *et al.* (1967) reported a study on cholinesterase activity and vitamin 'C' relationship with a group of schizophrenic patients, mentally deficients and normal humans as subjects. The findings corroborated the earlier reports that low cholinesterase activity is associated with low vitamin 'C' level, suggesting that the latter in some way maintains an enhanced activity through the removal of some inhibitory factors acting on the enzyme.

Chatterjee (1957) reported a case of drug addiction with pethedine hydrocholoride. The drug was used to save the person from a psychotic episode but it failed to have its effect. Sinha (1959) reported the effect of five phenothiazone derivatives in a variety of mental illnesses. Chlorpromazine was found useful in depressing emotional expression, thought disorders, psychomotor agitation and in schizophrenia. Compazine was useful in mild emotional disturbances such as anxiety, tension and agitation. Pactol has been found mostly useful in acute psychiatric patients with psychomotor disorders, withdrawal symptoms and menopausal syndromes. Sparine is useful with acute psychotic alcoholics and drug addicts. Trilafon is useful in the treatment of mental illness as it exhibits a greater degree of tranquilization and establishes its action with a very mild dose. Among all these five derivatives, Trilafon has been reported to be most valuable and useful in catering to the needs of a variety of psychotic and neurotic problems. Mukherjee (1961) has reported two descriptive articles, one on psychopharmacology and the other on frontiers of psychopharmacology. Kulkarni (1961) has also published a descriptive report on the psycho-pharmacological trends in Indian psychology. Mukherjee *et al.* (1962-63) reported the effect of marsiline on rehabilitation of epileptics. It has been emphasized that the problem of epilepsy should be treated in three aspects, viz., (1) drug management, (2) psychotherapy, and (3) rehabilitation. Phenobarbitone, Mesantoin and Mellaril are usually effective in the control of epileptic fits but their withdrawal causes violent recurrence. But Marsiline has been noted as anti-convulsant, nontoxic and very effective in mild mental behavioural disorders associated with epileptic patients. Besides controlling the fits, it has also been found to check the recurrence of fits. Mukherjee and Shah (1966) reported the effect of mescaline hydrochloride on the basis of expe-

riences revealed by two observers who had the drug themselves. The effect was observed after an hour. It was found that the drug produces split personality and that the subjects, not only experienced deviations in consciousness, but were also conscious of the deviant experiences. Vision, sense of dimension, auditory concentration were mostly affected. Sinha (1967) reviewed the studies on specific neuropharmacological activation of reticular structure published during 1949-1961, and reported that every cortical and subcortical system is heterogeneous in neuropharmacological sensitivity. Psychotropic drugs possess an exceptional specific and selective action. This specificity lies in differential effects of drugs on elementary process of excitation and inhibition in nervous system which can be explained on psycho-architectural principle. Neurotropic drugs, which selectively facilitate or inhibit the speed of synaptic transmission, have been classified and evidence has been presented regarding neuropharmacological agents like GABA and metrazol acting as selective synaptic inactivator and activator of the chemical transmitters involved in the activation process of the rostral part of reticular formation. Hundal and Gupta (1969) reported the effect of stimulant and depressant drugs on the measures of fluid (G_f) and crystallised (G_c) intelligence. Three matched groups of students, (1) control, treated with Placebo (calcium), (2) depressant, treated with phenobarbitone and (3) stimulant, treated with dexedrine served as subjects. Tests of G_f and G_c were administered in counterbalancing order after one hour of drug administration. The results revealed that a centrally depressant drug leads to a decrease in G_f. The hypothesis that centrally stimulant drug should increase all the subject scores was only partially proved.

Rao conducted a series of three experiments to study the effects of oxygen consumption on learning. In the first study (1969a), he used two groups of 10 male albino rats as subjects. The experimental group received 100 cc of oxygen, while the control group received 50 cc, before they were set on a visual discrimination learning task. The experimental group learned better than the control group. In the second study (1969b), he used 30 male and 38 female albino rats as subjects. They were classified into experimental and control groups. The control group animals were tested in a respirometer for ascertaining their rate of basal metabolism. After this test, they were classified into high and low oxygen consumption groups and their rate of learning was determined in a water maze with discrimination learning task. The experimental animals were also tested in a respirometer for their oxygen consumption prior to each block of ten trials in the water maze. All the subjects were given 30 trials in the water maze with escape as an incentive. The results

revealed that basal and intermediary metabolic groups were significantly different in so far as the oxygen consumption and rate of learning is concerned, and that the basal metabolic group consumed less oxygen and learned faster than the intermediary metabolic group. The female animals consumed more oxygen and learned faster than the male animals. In his third study, conducted on 105 albino rats, (1969c) he studied the relationship between sideness and the rate of learning on a visual discrimination task. By respirometer, the rate of oxygen consumption was ascertained and the water maze was used for the learning experiment. The subjects were grouped into low and high oxygen consumption groups and were given three blocks of trials with ten trials in each block for three days with escape as a drive. There were 68 animals in experimental and 37 in the control conditions, with 30 hours and one hour of food deprivation respectively. The results showed that experimental subjects learnt faster than the control subjects but there was no evidence of a significant difference.

Sinha and Acharya (1959) reported a study on the effect of tranquilizers and agitator drugs on conditioned avoidance response in rats. It has been observed that largactil and sarpsil as tranquilizers, specifically and significantly depress the conditioned avoidance response on the central and autonomic level, presumably making animals less fearful; whereas ritalin and adrenalin as central and autonomic agitators significantly increase the avoidance response, making animals less excited and fearful. Prakash and Sirsi (1960) administered hersaponin to rats prior to their testing in motor learning and observed some facilitatory action of the drug upon their water maze performance. Singh (1964) reported a study on the effect of chlorophromazine, a mildly depressant drug, on trained responses in combination with training level. The trained response used was a water-reinforced lever-pressing response in the rat and was elicited at five different levels of habit strength. It was found that highly trained responses become less susceptible to the deleterious effects of the drug, contrary to previous studies reported. Sharma, *et al.* (1965) reported abolition of conditioned avoidance response to electric shock in 20 per cent of their rat subjects, treated with the alcoholic extractive of convolvulus pluricaulis before testing and observed that a quaternary base of the isolate possesses tranquilizing property. Sinha and Singh (1967) and Singh (1968) ascertained the efficacy of the time of drug administration with respect to the effect of Herpestis monniera linn. Three conditions of drug treatment were used. Herpestis monniera linn (hersaponin), Pentabarbitone, dexedrine were administered to the rats under three conditions: (i) three hours prior, (ii) immediately after and (iii) one and half hour after a day's learning session. The dif-

ferential effect of the drugs could be ascertained only in the condition of immediate drug administration and herpestis monniera linn (hersaponin) was found to have a facilitatory effect on memory in a T-maze with brightness discrimination by albino rats. Paul (1968) reported the effect of caffeine on the behaviour of reactive and non-reactive animals. Open field defecation score was taken as a measure of the reactivity with the implication that higher the defecation score, the lower would be the reactivity. Shuttle box response was elicited under the effect of increasing dosages of pure caffeine. The results revealed a significant difference in the behaviour of reactive and non-reactive animals and the reactive animals showed a greater susceptibility to protective inhibition. Singh *et al.* (1968) studied the comparative effect of herpestis monniera linn (Brahmi) and convolvulus pluricaulis (shankh-pushpi) on brightness discrimination of albino rats in a single unit T-maze under different drugs treatment immediately after a day's learning session. It was observed that Brahmi facilitates learning of brightness discrimination more in comparison to placebo and the non-injection group. The effect of Shankh-pushpi could not be ascertained clearly and no difference was observed between the placebo and non-injection groups. Dey and Chatterjee (1968b) reported the neurogenic properties of glycosine on higher nervous activity. It was observed that this alkaloid blocks the central action of mescaline and counteracts chemo-convulsions induced by strychnine and metrazol. It also potentiates the thiopental induced narcosis and prevents the precipitation of circling movements and convulsions caused by cocaine. The alkaloid itself produces the tranquil state and hypotension in animals. Its usefulness as a potential therapeutic agent in some kinds of psychomotor disorders has been indicated. Dey and Chatterjee (1968a) reported psychotropic actions of the products from five indigenous plants on the general behaviour of rats. W. Somnifera (20 ms/kg), S. Indicum (40 ms/kg) and B. Monnieri (20 ms/kg) resulted in somnolescence state, less responsiveness to tactile, auditory and visual stimuli, less motor activity, induced drowsiness, dropping of heads, quietness, depression and closing of eyelids. E. Numulerius also resulted in drowsiness and induction of sleep posture. But prior to the onset of these effects, it increased motor activity and alertness was exhibited. E. Antiquorum, on the contrary, resulted in increased motor activity and heightened responsiveness towards external stimuli and a frightened attitude. The effects were noted to persist for nearly an hour. Sinha and Singh (1970) have also reported the effect of Herpestis monniera linn (hersaponin) upon form discrimination. Four groups, having intraperitonial injections of hersaponin, pentobarbitone, dexedrine and distilled water (placebo)

were compared on the basis of errors committed to reach the criterion of mastery. It was observed that the hersaponin treated group performed significantly better than all the other groups and the Pentabarbitone and dexedrine treated groups were not statistically better than the control group treated with placebo. Nor was the pentabarbitone treated group statistically better than the dexedrine treated group. This suggests the superiority of hersaponin's effect over all other drug treatments used. Singh and Sinha (1970) have further studied the effect of hersaponin on the learning of successive discrimination reversal series in Lashley's jumping stand apparatus. The effect of hersaponin has been reported in relation to pentabarbitone and dexedrine as well as with placebo. The drug treatment was made immediately after a day's learning session. It was observed that the effect of hersaponin was superior at the initial stage of reversal learning while, in the dexedrine group, significant differences were observed even upto the second and third reversal comparisons. Learning set phenomenon was observed in all the four groups after the third reversal problem which suggests that experimental variable, conducive for learning set formation, delimits the drug effects. Dandiya, *et al.* (1969), in making an experimental analysis of multi dimensional effects of stimulant and anti-depressant drugs on various behavioural parameters in rats have observed that there are dimensional differences within and between drugs.

Sinha and Sharma (1971) studied the effect of serenance on the arousal levels for different stimulus-intensities in the open-field test and found significant difference between the performances of the experimental and the control groups. The difference, according to them, may be due to the dampening effect of serenance on the sensory inputs to reticular formation.

VII. Cardiovascular Processes

Mukhopadhyaya and Sarkar (1957) reported a study on the different phases of cutaneous pain and pressure upon respiratory system with reference to normal conditions of muscular activity leading to fatigue.

VIII. Environmental Stress

Sen (1962) reported in detail an objective study of experimental neurosis. Bose and Dey (1967) traced historically the concept of psychosomatic relation and emphasised that psychosomatic relations act as a safety-valve of the organism in keeping harmony and effec-

tive adjustment and that the relationship is manifested through highly precise mechanism under autonomic control. In the absence of harmony, coordination is lost. In cases of one-sided activity, disease or disfunction sets in and, if it is prolonged, psychosomatic disorders appear. It is suggested that it is high time to emphasise environmental reconstruction to protect the organism so as to enable it to function normally.

Rai (1969) reported the effects of sleep and waking on subsequent brightness discrimination training in cockroaches. It was found that sleep has a facilitatory effect on brightness discrimination training. It was also noted that the effect of sleep was significant with 24 hours duration and insignificant after 48 hours duration. Dim light was preferred as a positive cue for the brightness discrimination.

Chakrapani (1968) reported a study on the anoxia and retention of maze learning habit.

Chakrapani (1969) reported the effects of the two levels of anoxia equivalent to 20,000 and 30,000 ft. altitude subjected for 20 minutes, on the learning of a discrimination habit. Animals were required to learn to discriminate the horizontal vs. vertical. It was found that animals subjected to anoxia differed significantly on the trial scores. The animals with a higher level of anoxia made significantly more errors than the control group of animals.

Chatterjee, *et al.* (1970) reported the effect of varying periods of stress on thyroid gland and respiratory system. Three stress conditions, i.e., (1) physiological stress, leading to anxiety, (2) creation of intense fear and (3) deprivation of food, leading to anger were studied in three durations of 4.8 and 12 hours. It was found that in all cases of stress conditions the structure and function of the thyroid gland was altered. Respiratory system was also affected significantly in all cases of stress conditions. The emotional stresses of fear and anger were more effective and lasted longer. Animals became adaptive with the increase in the duration of stresses.

IX. Genetics

No work has been reported.

X. Personality Correlates

Ganguly and Ray Chaudhuri (1969) reported a study on 20 convulsive patients for psychological adjustments under primidone therapy in relation to other anti-convulsive treatments. A comparison in psychological adjustment was made of the seizure-controll-

ed patients and seizure-free patients, with the help of Davidson's adjustment scale. A statistically controlled Rorschach study revealed that seizure-free patients with one year of primidone significantly improved as compared to seizure-free patients under other anti-convulsive treatments. A comparison of pre-and post-primidone therapy revealed a significant improvement on adjustment scores, whereas other drug-treated patients showed an insignificant psychological improvement.

In a follow-up Rorschach study, Raychaudhuri (1970) found that while there was no significant difference between the adjustment scores of the primidone and other drug groups at the end of six months' medication, significant difference was noticed in favour of primidone groups after one year, two years and three years of constant medication in terms of the level of personality adjustment.

XI. Nutrition

Sinha (1962) reviewed eight studies (published during 1936-48) under the caption 'metabolic deficiency and behaviour pathology' concerning food deprivation and dietary deficiency on behaviour. It was pointed out that a study on the exact relationship between metabolic deficiency and behaviour pathology would be a genuine scientific contribution. It seems apparent that metabolic dysfunction and organic systems including brain and extra-neural changes probably exert their indirect effect on behaviour.

Rajlakshmi *et al.* (1965b) have reported the effect of early protein deficiency upon the adult rat's visual discrimination. Albino rats of 1, 6 and 12 months of age were maintained on diets totally deficient in protein content for 4 to 6 months and were then subjected to psychological testing. Animals of all the three age-groups performed poorly on visual discrimination learning in comparison to animals fed on high proteins. Dietary repletion of protein was found to reverse the changes to some extent.

Sinha *et al.* (1966), reported an investigation on the relationship between protein deficiency and intelligence. Albino rats (littlermates) were fed with protein deficient diet at $1\frac{1}{2}$, 2, $2\frac{1}{2}$ and 3 months of age and were tested for their performance on Hebb-William's standardized mazes for measuring animal intelligence. Significant differences were found between experimental (protein deficient) and control animals of $1\frac{1}{2}$, 2, and 3 months of age. The biochemical analysis of the brains of $1\frac{1}{2}$ and 2 months old rats revealed a decrease in alpha-amino nitrogen and ribonucleic acid contents which suggests that protein deficient diet affects the brain cells and retards the performance of animals. Equating maze learning ability with the

intelligence of animals studied, it has been hypothesized, that protein deficient diet impairs intelligent performances, due to its adverse effect on brain cells.

Shukla *et al.* (1967) have reported a study on the effects of induced protein deficiency in early infancy on the performance of albino rats. Initially, two comparable groups of one month of age were kept on diets for 15 days, the experimental group fed only with 5 per cent protein deficient diet and the control group with 16 per cent case in normal diet. Later on, the experimental and control groups were maintained on 16 per cent normal protein diet so long as all the animals caught up nearly the same weight, after which these animals were subjected to intelligence testing on Hebb-William's mazes and were maintained on normal protein diet throughout. The results revealed a significantly inferior performance of experimental animals which suggests that repletion with normal diet does not permit recovery of the changes produced as a result of protein deficiency induced in early infancy. These findings have important implications for the nutitional deficiencies in humans.

Sinha and Sharma (1970) reported a study on the comparative effects of Beta-carotene and vitamin 'A' on the learning of short term retention of light-dark discrimination in rats in four phases. In phase I the pre-administration of the Beta-Carotene and vitamin 'A' to the animals of both experimental groups A and B; in phase II the acquisition of brightness discrimination for all animals for seven days; in phase III the fixation of learnt brightness discrimination under differential effects of the drug; and in phase IV testing for their retention of brightness discrimination. It was observed that a clear difference in the acquisition of brightness discrimination responses exists with the initial administration of Beta-Carotene and vitamin 'A' in Group A and B respectively. The brightness discrimination scores were significantly higher in Group B than Group A.

Psycho-Pharmacology

Judging from the total number of studies carried out, it appears that Indian researchers have shown greater interest for work in psycho-pharmacology.

Most of the psycho-pharmacological researches are involved with drugs that exert their effect upon behaviour. These drugs have physiological effect and, they also affect environmental contingencies that maintain the behaviour of an individual at the time. Physiologically, administration of a drug may alleviate symptoms of a disease; but what it does to the behaviour of the consumer has be-

come a matter of concern for the psycho-pharmacologist. The plea is that the behavioural screening must be carried out prior to putting a drug to clinical trial.

Polidora and Bowman (1966) have provided an excellent treatise on the procedural requirements and methodological issues of psycho-pharmacological investigations and emphasized an integrative approach to this humanistic and academic pursuit. A psychologist willing to analyze the behavioural exigencies accruing out of drug administration needs only a broad-based training in physiology and biochemistry. Once the chemical structural characteristics of a drug are known and its physiological, pharmacological, and biochemical analyses are available, a psycho-pharmacologist selects appropriate samples of behaviour, ranging from simple to complex, to conduct tests for ascertaining the additional parameters of the drug.

On the Indian scene, psycho-pharmacology appears to be a very useful area of investigation. It is quite suited to the current taste and training of Indian research personnel in the sub-fields of animal and physiological psychology. We must, however, note that the mid-twentieth century experimental literature has accumulated a large number of studies on the effect of various synthetic drugs upon behavioural changes pertaining to altered drive level, habit reversals, transfer, memory, habituation, dissociation of response, resistance to extinction, discriminable avoidance performance, escape reaction, anxiety, sleep, etc. Accordingly, it would be advisable, economical, and time-saving not to duplicate the work already done and to study the behavioural effects of synthetic drugs already explored by merely bringing in some ancillary changes, whether in the experimental design or in the test apparatus. It would be more advantageous if we could carry out social trace studies with animals, varying the drug-treatments. This will certainly bring a distinctiveness to Indian psycho-pharmacological investigations.

The recent researches on Indian indigenous drugs under the sponsorship of the Indian Council of Medical Research have also opened up immense possibilities for valuable contribution by the Indian psycho-pharmacologists. The indigenous drugs, out of necessity, require processing, through screening, along traditional lines of behavioural analyses and such studies must eventually end up with experimental evidences on the long and short-term effect of indigenous drugs in representative social situations, using animals as subjects.

Animal Sociology

There is no place for the sceptics to belittle the implications

of studies on animal sociology in arriving at the general concepts of human social organization. Howard's observation on the significance of song and territory in birds, Schjelderup-Ebbe's description of social dominance in hens, Allee's work on animal aggression, Carpenter's report on social relationship and organization of free-living primates, Lorenz's study on the formation of primary social relationships in birds, Wheeler's theory of trophallaxis as the basis of social organization in termites, Schneirla's work on complex societies among the army ants and Von Frishch's on the existence of a "language" in bees, are some of the instances of pioneering efforts which still have a unique contribution to make to the understanding of human social organization. A growing number of psychologists are presently devoting themselves to sociological studies on animals. It would, therefore, be in the fitness of things that studies on animal sociology are supported at the Indian Universities.

Some Recommendations

It is to be regretted that we know next to nothing about the great majority of Indian species of animals. It is high time that we begin to understand at least a few types of behaviour within the repertoire of Indian animals. The amassing of information needed for this, systematically, is no small task and deserves liberal financial assistance.

Researchers in the field of animal and physiological psychology must keep up with the speed of advance in the related disciplines. Harlow (1958) suggests the formation of research teams representing members of all the disciplines whose data are to be related in order to safeguard against the temporal lag in interdisciplinary information. Such a co-operative endeavour needs to be undertaken for research accomplishment and this spirit has been demonstrated by the little work done by Indian psychologists in the area of physiological psychology. It is unfortunate that the psychology departments of Indian Universities are not adequately equipped with laboratory facilities for conducting routine experiments on central nervous system, autonomic nervous system, electrophysiology and biochemistry. This deficiency will have to be removed. Funds will also have to be made available for collaborative research projects in physiological psychology.

So far, only about half a dozen researchers are known to have worked for their Ph.D. degrees in animal and physiological psychology at the Indian Universities. This emphasises the great need for attracting an increasing number of Indian scholars for investigating into the interdisciplinary areas of animal and physiological psychology.

In recent years, a psychologist, as a true behavioural scientist, has to cast his net as wide as possible in order to maximize utilization of data and ideas from other disciplines such as zoology, ethology, genetics, physiology, anatomy, biochemistry and many others.

The field of research will ever remain unchartered and any attempt to delimit the area of research within a branch of knowledge is futile. We need only to check on the aimlessness and lack of proper co-ordination in research planning. It is, therefore, necessary to encourage all research activities that lead to systematization of the existing body of knowledge as well as all exploratory or developmental research which deepens interest in and extends the horizons of knowledge. Let it not be forgotten that continuous disputation which accompanies research often brings in new facts and sometimes, startling new ideas.

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9

Social Psychology

A Trend Report

By

R. N. Rath

Introduction

THIS BRIEF report on research in Social Psychology strives to identify broad trends in the field, and to indicate the major gaps in the existing situation and important areas in which future research may be developed on a priority basis.

In spite of the best efforts made, it was not possible to cover all the studies in this field. It may be pointed out that, due to non-polarization of the various branches of social sciences, many good papers on social psychology have been published in the journals of other fields of study, especially before the 1950s. While known papers of the known persons have been reported here, it is only to be expected that some have been overlooked. It was also not possible to have access to several unpublished documents. The limitation of time was also responsible for restricting the studies covered to some extent. It is to be hoped that these deficiencies could be made up, to the extent possible, in future surveys.

The Studies

The total number of studies which could be tracked for purposes of this survey came to 527 as shown in Table 1.

The distribution of papers over the last four decades indicates the general trend of social psychological research in India. Prior to 1940, there are only 55 papers covering all the eight areas of social psychology. During the next decade (1940-50) there was a little growth in research activities, and only 64 papers were pub-

TABLE I

Description of Research Papers on Social Psychology

Subjects	Years Before 1940	1940-1949	1950-1959	1960-1969	Total
Cultural and Social Processes	36	49	49	143	277
Attitudes and Opinions	1	1	27	64	93
Group and Inter-personal processes	5	3	14	49	71
Communication	3	1	2	21	27
Aesthetics	6	5	2	7	20
Sexual Behaviour	3	5	1	0	9
Smoking and Drug and Alcohol Use	0	0	0	1	1
Methodology	1	0	7	21	29
	55	64	102	306	527

lished. But during 1950-60, the number of papers increased to 102 and in the next decade (1960-70), to 306. This shows how recent the research in this field is.

If one examines the distribution of papers under the different heads of classification, it is quite evident that the different areas of social psychology have not received equitable attention. The growth rate is fastest in the area of cultural and social processes; attitude and opinions come next, followed by group and inter-personal processes. The papers on communication, aesthetics and methodology are balanced. Papers on sexual behaviour are extremely scanty and on smoking, etc., there is only one paper.

It may also be pointed out that research in social psychology is, on the whole, problem-oriented. This trend is quite useful at the present stage; but here is an obvious need to pay greater attention to theory and methodology.

I. Cultural and Social Processes

Cultural and Social Processes

There are several areas common to Sociology and Social Psychology. Both the disciplines converge so closely upon a common set of problems that it is sometimes neither possible nor desirable to isolate one from the other. The social structural concepts may remain mere abstractions without the empirical findings of their behavioural dimensions, and similarly, the latter may remain incomplete without the basic constructural components relating to

the particular operational structures. It has, therefore, become a serious problem for sociologists as well as social psychologists to encompass both kinds of variables in a single conceptual framework. Cultural and social processes are dynamically interlinked with personality syndromes so that a behaviour pattern can only be understood in the context of its socio-cultural milieu. There is, therefore, a great need for a multi-disciplinary approach to research in this field.

Indian social psychologists are quite aware of the problem of integrative approach and a few of them have made use of it (Abdin, 1940; Adhikari, 1960; Anant, 1966b, 1970b; Bhattacharyya, 1944; Bose, 1930; Bose, 1943; Dutta, 1948; Ghosh, 1941; Gore, 1968; Loomba, 1944, 1966; Mishra, 1961; Mitra, 1929, 1938; Mukdum, 1938; Mukherji, 1966, 1967; Neki, 1967; Patel, 1960; Prakash, 1957; Punke, 1937; Rath, 1968; Ray Chaudhuri, 1966a, 1966b; and Shrimali, 1962). There are some conceptual studies relating to psycho-social aspects of cultural relations like cultural conflict (Bhattacharyya, 1947, Dutta, 1948), cultural change (Mitra, 1932), evaluation of certain trends in Indian culture (Rajan, 1957) and human relations in the Indian Scene (Ram, 1952). Kornar and Mishra (1967) and Veeraraghavan (1966) have dealt with complex aspects of socio-cultural and concomitant interactional behaviour. Investigations have been undertaken to study psychological problems and consequent conditions relating to war (Bhattacharyya, 1941; Mitra, 1927; Mukherji, 1946), peace (Loomba, 1946; Mitra, 1927; Mukherjee, 1947) and psychology of natural catastrophes (Sinha, 1952, 1954). They deal with behavioural problems in emergent situations. Psychology of security (Rajnarain, 1955), adjustment problems of the caste and occupational groups and races (Adinarayan, 1957a) have also been studied. Minority problems have also been viewed from the psychological standpoint (Abdin, 1948).

Two theoretical papers on culture conflict (Bhattacharyya, 1947; Mitra, 1947), and empirico-deductive studies on social tension (Murphy, 1953) opened up a new direction of research. A UNESCO study of social tension in Aligarh is one of such studies (Ram, (1955). Another study has focused the psychological disposition of various tensions prevalent among refugees residing in Ahmedabad area (Dosajh, 1953) where, besides other findings, one interesting revelation was that the middle class people had shown the maximum tension. The findings of intercaste tension in two villages of North India (Singh, 1957) may be described as a study of caste tensions. A psychological analysis of caste tension (Sinha, 1964), caste dynamics and caste relationship (Gist, 1954; Sinha, 1960)

have suggested a pertinent paradigm for the reduction of caste tension and opened ways for further research in this area of national interest. The cognitive background of six Hindu caste groups regarding the low caste untouchables (Rath and Sircar, 1960c), intercaste relationship as reflected in the study of attitude and opinion of six Hindu Caste groups (Rath and Sircar, 1960a), the mental picture of six Hindu caste groups about each other (Rath and Sircar, 1960b) and recent research by Anant (1970a, 1970b, 1970c, 1970f, 1971a, 1971b and 1971c) go a long way in locating the areas of intercaste tensions. More intensive research based on inter-disciplinary approach is needed to unravel the psycho-social intricacies which are responsible for many explosive patterns of intercaste behaviour.

The habits and behaviour patterns of middle class people have also been studied. The social and marital status of women as well as their changing values were investigated (Rama Devi, 1963; Nataraj, 1966-1967; Kapil and Aggarwal, 1967). The study on experiments into middle class habits and preferences (Mitra, 1944) point to a new direction of further research. The processes of adjustment of children and adolescents to different social situations (Singh, 1960; Reddy, 1967, 1968), their mutual choice and admiration of friends have not been neglected (Chatterjee, 1958) and the consequent behaviour maladjustment problems are also touched upon (Sengupta, 1944c). The question of adaptability of the refugees to a new environment (Ray, 1957) and of the farmers to innovations (Kapil, 1966) have also been studied. Social processes involved in voting behaviour (Ganguli, 1969; Prakash, 1954) have been studied but no clear cut attempt has been made to isolate the psychological components from the sociological ones, except in a paper (Mallick, 1962) on the content analysis of election propaganda. Hindu social institutions and their psychological implications (Valavalkar, 1939), psychology of nations (Bhattacharyya, 1945), cultural heroes and their ego ideals (Joshi and Joshi, 1967), are some of the topics researched upon with social-institutional and behavioural dimensions. A study of cultural factors in the emergence of anxiety (Sinha, 1962) analysed the occasions as well as the predisposing cultural factors and brought out the dynamics of tension in relation to socio-cultural conflicts.

Ethnological Studies

Taking a cue from the anthropological studies, psychological studies of the race mind and its relation to psycho-social occurrences like crime, suicide and insanity (Sengupta, 1944c), color-preferences

(Basu, 1949), sensory traits and reaction time (Sengupta, 1944b) have been attempted. The results have remained an open project for further incisive probe. Ethnic differences of stereo-type patterns (Das, 1962) and perceiving theme on TAT (Ghosh, 1962) have been undertaken. In this area, not only are the number of studies very limited, but the methodological orientations are also less sophisticated. Some articles relating to attitudes and values of American, British and Indian students (Bhatnagar, 1967, Beg, 1966) and Indian and Western children (Hoyland, 1926) are stimulating, though not theoretically authenticated.

India has a large number of ethnically different groups of people having different modes of living. Many anthropological studies have been done on such problems, but Indian social psychologists have almost neglected these very important areas. If the social psychologists and anthropologists can join hands in this regard, a valuable area of research will open up and will help the administrators as well as the scholars with answers to various burning issues.

Socio-Economic Structure and Social Role

A couple of investigators have taken up the task of constructing a scale to measure socio-economic status (Kuppuswamy, 1959) and analyse its variables (Kuppuswamy and Srinivas, 1960). Verma (1963) attempted to develop tools to appraise this social phenomenon. Some psychologists have attempted to correlate socio-economic factors with personality traits (Joshi and Singh, 1966) like intelligence (Nim, 1966), character traits (Patel, 1961b), and anxiety and hostility (Mohanty, 1967). Another study indicates a functional relationship between the contrasting socio-economic background and family attitudes of children (Ansari and Ghose, 1959).

Rajalakshmi (1968) investigated the psychological status of underprivileged children reared at home and in an orphanage. The socio-economic structure of unemployment is likely to give rise to psychological problems of various kinds in the individuals as well as in the groups. Veeraraghavan (1970) investigated unemployment in society on the basis of social, economic and psychological impact of unemployment on the person and his family. This kind of study has emergent psycho-social implications. Similarly studies like social-psychological factors influencing industrial entrepreneurship in rural areas (Gaikwad and Tripathy, 1970) should be encouraged increasingly in a developing country like India. Considering the vast socio-economic differences found in this country, there is

need to study the psychological implications of these variables more extensively and on a nation-wide basis.

Religion

Broader psycho-social aspects of religion studied by Indian psychologists (Aslam, 1939; Anant, 1966b, 1970e; Berkeley-Hill, 1921; Bose, 1930; Gladstone and Gupta, 1963; Loomba, 1966; Mehta, 1945; Mitra, 1945; Rosel, 1928; Sinha, 1950) contain copious materials for further empirical research. In addition, there are papers depicting the way of religious life in general (Ghosh, 1941), psychology of rites (Mukherjee, 1929), and psychology of devotional feeding (Sarkar, 1933) which illustrate new areas of research. Some papers have tried to describe the genesis and development of religious concept and experience and form fertile fields of further research (Berkeley-Hill, 1932; Bose, 1929; Bose, 1943; Loomba, 1942, 1967). Some investigators have analysed the iconography of Hindu Gods and Goddesses from psycho-analytic and other points of view (Aiyappan, 1940; Ray Chaudhury, 1956; Sastry, 1944; Sinha, 1949). There are some psychologists who think that religious observances help man to adjust the inner conflicts arising in critical situations relating to sex, getting of food, birth, etc. (Bhattacharyya, 1944; Sarkar, 1938). Another study has tried to relate religion to population explosion (Ganguli, 1969). Attempts have also been made to understand culture through mythology (Daly, 1927; Mukherji, 1926; De, 1951; Patel, 1960) and factors determining the changes in religious phenomena (Mitra, 1945) and the impact of modern science and technology on spiritual values and traditions (Mukherji, 1967). These help in understanding the psychological nature of religious practices and beliefs and its historical progression and impact on current life. The attempt of ranking the Hindu castes (Mahar, 1960) by a ritual pollution scale is a novel method determining the caste hierarchy. A paper containing field concept (Mitra, 1948) is the only serious attempt to analyse the structural pattern of devotion on the basis of Lewinian approach by an Indian, probably first in the international arena.

There are a few papers on Yoga. They include psychoanalytic structure of Yoga practices (Neki, 1967), the psychological structure of Yoga practice (Rosel, 1928), experiments on a Yogi in controlled states which amassed observations on E.E.G., E.C.G., G.S.R. and spirogram recordings (Rao, H.V.G., *et al.* 1958), studies of autonomic functions in practitioners of Yoga (Wenger and Bagchi, 1961), and sex in "Tantras" (Mukherjee, 1926).

The lines of study indicated under religion are likely to open

up a vast area of complex human experiences which should be seriously taken up by Indian psychologists. The few research findings mentioned here are based on philosophical religious concepts which are to be redefined and analysed from the psychological point of view.

Cross-Cultural Comparisons

Cross-cultural studies relating to values, attitudes, stereotypes and some personality characteristics have been reported. These emphasize cross-cultural differences found in habitual response preferences indicating anxiety (Singh and Retting, 1962), a cross-cultural study of belongingness, anxiety and self-sufficiency (Anant, 1970), social desirability judgments (Mukherjee, 1967a), occupational ratings (Sharma and Sinha, 1968), factors relating to ascendance-submission reaction study (Ray Chaudhury, 1958), Rosenzweig P-F study (Pareek, 1958), Rorschach (Prabhu, 1967) and Allport-Vernon-Lindzey study of values (Ray Chaudhury, 1959). There is one piece of work on a factorial study of cross-cultural values and related biographical data (Sinha and Ralph, 1963). There is also a cross-cultural study of persons within the industrial belt of Calcutta (Roy, 1963). Many of these cross-cultural studies cover only American, British and Indian students (Beg, 1966; Bhatnagar, 1967), except in one case where Chinese students have also been included (Singh, Huang and Thompson, 1962). This limits the value and scope of this kind of work. The area covering cross-cultural problems is not only extremely small but its scope and application is also very much restricted. From the Indian standpoint, these studies may be described as cross-national studies. The Indian situation demands that cross-cultural studies may be undertaken with the different peoples residing in India in various parts of this sub-continent, as their cultures are quite different from one another. These studies may then properly be termed as cross-cultural.

Family

A small number of psychologists have studied problems like psycho-social nature of the Indian family pattern and of marriage (Kapadia, 1954), marital relationship and emotional involvement (Rahman, 1967), marriage in India (Thomas, 1940), nature of marriage and sexual partners in Kerala (Ali, 1968) and psychological investigation into marital relationship (Pareek, 1954). It has been very difficult to isolate the psychological factors from the sociological ones.

There are some studies on basically psychological problems which have been explored in the investigations on family roles and sex-differences in creativity of children (Straus and Straus, 1968), adjustment of adolescents to the various sizes of structures of the families (Reddy, 1967, 1968), the influences of parents on the behaviour of adolescents (Singh, 1960), and family size and sibling position as related to intelligence test scores and academic achievement (Chopra, 1966). This kind of study is more difficult to undertake due to the large number of multi-disciplinary variables involved in such problems.

Social Change and Programmes

This group of research includes studies like motivation of rural population in a developing country (Sinha, 1969b), motivational analysis of a village in transition (Sinha, 1969a), level of aspiration of villagers in community development areas (N.I.C.D., 1963-1965), motivational patterns and planned social change (Pareek, 1968a), a study of personality and socio-cultural change (Veeraraghavan, 1966), social revolution (Sadharia, 1928), reaction of the peasantry towards new reforms (Kapil, 1966), the impact of Western civilization on eastern ideology and ways of life (Chand, 1951), social and psychological significance of variability in population change (Gaddes, 1947), morale components of the community development programme (Mallick, 1967) and determinants of opinion about national planning (Mallick, 1969).

Investigations relating to the psychology of cultural change (Mitra, 1932) or the changing pattern of values amongst women in modern Hindu Society (Kapil and Agarwal, 1967) reveal the direction of cultural change. There is only one study which deals with resistance to socio-economic development (Joshi, 1966a). Without exposing the areas of resistance to change, it is very difficult to understand the processes of social and cultural change. But unfortunately these important areas have still remained unexplored. Only a research project sponsored by the National Council of Educational Research and Training, New Delhi on *Sociology of Education* in eight states of India reveals many aspects of resistance to change as well as processes of change in education, values, attitudes, and various other psycho-social factors (Rath 1968, Gore 1968). More studies of this type should be undertaken.

The processes behind the programmes of induced social change in the changing social context of this country should be carefully investigated and programmes of change should be planned. These factors are extremely important but Indian social psychologists do

not seem to have seriously taken up this problem. It will not be inappropriate to mention here that this explains why the social psychologists are noted for their absence in all forums of national programmes relating to social change instituted by government and other agencies. Without studying psychological components of social change and the concomitant areas of psychological resistances, no programmes of social change would remain purposeful without taking into consideration the basic cognitive and motivational systems involved in the process of social change.

II. Attitudes and Opinions

Scales of Attitude Measurement

Research on attitude and opinion should include a great deal of rigorous work on the quantitative aspects of scale construction which is a basic methodological problem in this area of investigation where modern findings in psycho-physics and psychometrics have to be meticulously followed and utilized according to the design of the problem and consequent orientation of the observations. Some attempts have been made for developing scales of attitudes such as those towards conservatism and radicalism (Rao, 1960) or idealism and realism (Rao, 1961, 1962; Singh and Chatterjee, 1967). One investigator has devised a method known as factor dividing rating method by emphasizing weightage aspects and has deduced an equation for evaluating the weightage of the attitude components (Kundu, 1960, 1962). By utilizing the above model, he also put forward a new concept of attitude (Kundu, 1966). Centroid technique of factor analysis giving rise to three bipolar factors of social attitudes has also been attempted (Rao, 1962). Another worker surveys the field of opinionometric research and has shown applicability of factor analytic technique (Mallick, 1967). Attempts have also been made to develop a scale with Q values (Singh, 1963) and non-normal distribution (Kundu, 1960). Some papers are available to measure social distance (Rao, 1960; Kuppuswamy, 1952; Sastry and Rao, 1952). There is also an interesting piece of work to find out the validity of indirect measures of attitudes (Singh 1966). The above studies are some examples of Indian ingenuity; but no attempt has yet been made to use the scales and the techniques under different conditions by different investigators so as to confirm the claims of their reliability, validity and other aspects of their findings. Considering the importance of attitude scale construction, the work done in this regard does not seem to be very adequate; and there are not many well established and widely accepted standardized scales of attitudes available for Indian conditions.

Survey of Attitudes and Opinions

Maximum work has been done in connection with the survey of attitudes and opinions of various groups of people towards all kinds of social, political, cultural and economic issues facing the country. During the last two decades, India has been passing through a transitional period of great socio-cultural and political changes. This psycho-social phenomenon might have prompted Indian psychologists to make a quick survey of attitudes of different socio-political groups in order to predict group and individual behaviour in different social and political situations or even for purely academic reasons. The investigations include studies relating to attitudes towards caste, communal and racial groups (Adinarayan, 1953, 1957; Anant, 1970b, 1970c, 1970f, 1971a, 1971b, 1971c; Rath and Sircar, 1960; Kuppuswamy, 1956), cultural and educational problems (Sinha and Singh, 1960), attitudes connected with modernization (Joshi, 1962) and traditional values (Rama Devi, 1963), social integration (Roy, 1965), language (Allard, 1966), Sharmadan (Kale, 1969), urban and rural life (Joshi, 1966b), the religious, spiritual and supernatural (Adinarayan and Rajamanickam, 1962), adolescent behaviour (Lokhande and Naimie, 1967), autocratic and democratic attitudes (Muthaya, 1958), motion pictures (Panda and Kanungo, 1962) and several other inter-personal and group relationships. Analysis has also been made of the attitudes of voters towards the politicians (Bhushan and Singh, 1969; Ganguli, 1969), farmers towards the agricultural programmes (Singh *et al.*, 1966), parents towards their children (Lokhande and Naimie, 1967; Sinha, 1967), students towards the educational problems (Sinha and Roy, 1959; Sinha and Singh, 1960). Some studies have also been done on attitudes of criminals towards their family, parents and authority (Singh, 1967), maternal values and attitudes towards emotionally disturbed and physically disabled persons (Sinha, 1967), inter-personal attitudes among Americans, Japanese and Indians, etc. (Triandis *et al.*, 1966). Several studies have investigated and explored various types of attitudes such as social attitudes (Bhusan, 1968), socio-political attitudes and prejudices (Bhushan and Singh, 1969), attitude towards the congress (Misra, 1954), attitude towards politico-economic issues (Rath 1955, 1958), socio-cultural and educational issues (Rath, 1957, 1959; Sinha and Roy, 1959), social integration (Roy, 1965), social attitudes and voting behaviour (Ganguly, 1969), Harijans (Shankar, 1966) and agricultural programmes (Singh *et al.*, 1966).

This type of studies have potential usefulness for the planners and the administrators but very little comparative value because very few attempts have been made to bring out the broad trends

of *national* attitudes towards these urgent socio-political, cultural and educational issues of the country. Each investigator has taken a small group of people in his own locality and studied the content and distribution of attitudes. But very little work has been done to co-relate or compare his results with those of other investigators. A good study in this field is crystallization of opinion (Mallick, 1963). Though not a cross-correlational study, it has an intrinsic potentiality of this kind. From the integrative global point of view, only one investigation entitled 'Sociology of Education' has been undertaken so far. It includes a study of attitudes and beliefs of teachers, parents and students on a national level with data collected from eight states (Rath, 1968; Gore, 1968).

Although extensive work has been done in this area, the utility and importance of the results are thus considerably restricted. In addition to this major shortcoming, there are also some other gaps in this area of study. Except a couple of studies, there is hardly any longitudinal investigation on the formation, growth and change of attitudes in relation to a group of people in a course of time. This type of scholastic work is not possible unless there is a group of devoted social psychologists dedicated to a coordinated type of research in this field. It may, therefore, be suggested that some departments of psychology in Indian Universities should be encouraged to undertake this kind of study. Another serious drawback is that most of the studies have taken student samples and have drawn conclusions therefrom. This obviously gives a partial view of the intended area of research and biases the conclusions. Observations must be made on purposive or global samples for drawing conclusions that can be generalized. This approach will give Indian Social Psychology a broader perspective.

Stereotypes and Prejudices

Like the survey of attitude distributions, quite a few studies have been attempted on the analysis of the structure of stereotypes and prejudices in different social groups in relation to other national, international and ethnic groups (Sinha and Sinha, 1966; Sodhi *et al.*, 1956; Chandra, 1967; Rath and Das, 1957, 1958), races, tribes, castes and various communities (Anant, 1970a; Bhushan, 1969a; Nataraj, 1962; Panchbhai, 1963a, 1964, 1966a, 1966b, 1968). Some interesting studies have also been made to study the stereotypes of people for themselves (Jain, 1967). In order to find out widely accepted verbal stereotypes, the technique of comparing two dissimilar groups has been successfully adopted (Rath and Das, 1957, 1958). Although these stereotypes are supposed to be national in

character, the use of stereotypes varies in different studies and no comparison of results has been systematically attempted. The study of stereotypes appears to be quite popular like that of attitudes. There are quite a few investigations like group stereotypes and social distance (Ansari, 1956), stereotypes among Hindu sub-castes (Anant, 1970a; Bhushan, 1969a), stereotypes among Hindu castes about each other (Nataraj, 1962), mental images of six Hindu caste groups (Rath and Sircar, 1960b), Hindus and Muslims (Rizvi, 1955), Indian tribes (Panchbhai, 1966b), stereotypes towards ethnic groups (Chandra, 1967b; Sinha and Upadhyay, 1960a, 1960b), sex differences in linguistic stereotypes (Devi, 1968), stereotypes among national groups (Jain, 1967), and provincial stereotypes (Mukherji, 1954). There are some more studies of this type.

The work on prejudice has not been very extensive. Studies relating to cognitive background of prejudices (Adinarayan, 1957a), social prejudice (Kothurkar, 1954, 1955, 1962), national prejudice (Sodhi and Bergus, 1953), prejudice among students (Sinha and Singh, 1960) and areas of prejudice in India (Sujaya, 1966) have brought out some important features of prejudice as a psycho-social phenomenon, but very little work has been done on the genesis and evolution of stereotypes and prejudices. Studies have been conducted on group membership and stereotypes (Panchbhai, 1963, 1964) but there is hardly any study to relate it to basic personality structure and social situations. The works on attitudes and stereotypes are mainly of survey type and do not generally have any theoretical constructs behind them. The time is therefore ripe to construct a theoretical model to explain the rich observations in this field.

Attitude Formation and Change

Attitudinal change occurring in group situations and due to group pressure or persuasion is very important for the study of attitudes. Some studies are available relating to attitudes and group situation, but compared to attitude and stereotype surveys, the amount of this work is small. The role theory which presumes that one's attitudes are influenced by one's position in the social system has assumed a special importance in modern social life. Dearth of studies over this issue must be made up.

Some important studies relating to change of attitudes due to various social factors like modernization (Dass, 1953), leadership influence and guidance (Mehta, 1962), group discussion (Rath and Mishra, 1963) or class room instructional methods (Singh, 1956-57), culture contact (Prabhu, 1953), value orientation (Singh

1967) and some personality and leadership variables (Rath and Mishra, 1963) are available. An experimental study on the effect of group pressure on the visual estimation with and without reference to actual values of the presented stimuli (Mukhopadhyay and Majumdar, 1960) is the only laboratory evidence of this type. Studies have also been made into problems like conflicting patterns of social action, motivational factors, camping contact (Oad and Chatterjee, 1958), conflicting situation (Krishan, 1954), forced migration (Sinha, 1960), changed situation of a community project area (Shankar 1959), social media like lecturing (Rath and Mishra, 1963) and spreading of rumour (Sinha, 1954).

One interesting study has been reported on attitude change as related to communication, intelligence and suggestibility (Dhawan, 1968). Kuppuswamy (1956) investigated the consistency of opinion. But the results did not indicate any conclusive proof in this regard. Some of these studies have brought out very useful dimensions which require more intensive studies. The work in this field seems to be at a very early stage of growth, although it has been taken up by a few investigators with utmost seriousness. Induced social change which has become an important socio-political problem of this decade cannot be properly understood or fruitfully undertaken unless studies on the various factors relating to attitudinal change are systematically studied by social psychologists. Except a couple of papers on group influence on change of attitudes, hardly any serious work has been done to locate the areas of resistance to change, depending upon the higher or lower salience of individual and group attitudes. Controlled experimental studies are obviously required to develop a theoretical model of change.

This kind of study is very important in India which is passing through a transitional period when change of values and attitudes is considerable. Drastic changes also give rise to strong resistance to change. The problem of persuasion and propaganda on the existing syndrome of attitudes and opinions is also worth investigating. The nature of attitudinal syndrome has not been investigated so far.

Some attempts have been made to indicate that strongly held attitudes are less susceptible to change than weakly held attitudes; but no systematic investigation is noticeable in this area. Family influence on the formation and change of attitudes is not at all studied. Attitudes towards religion and science and personality traits like neuroticism, rigidity, security-insecurity have been studied. The influence of temperament (Vasantharajaiah, 1958), conservatism (Rao, 1960), living conditions (Junghare and Roy, 1963), social background, personal and situational determinants (Patel and Gordon.

1960), group ideology (Bhushan, 1968b), effect of westernization, (Dass, 1953), professional occupations and training (Chandra, 1965b) and choice of leadership (Bhushan, 1969c) on the formation and function of the various kinds of attitudes have been investigated. But in this area also, the studies are based on small samples selected for one's own convenience and no confirmatory and repeated studies have been undertaken to build up the necessary theoretical framework without which the behavioural dimensions remain unexplained.

III. Group and Inter-Personal Processes

Group and Inter-personal Processes

Investigations on topography of a group (De and Sinha, 1962), group cohesiveness and productivity (Bose, 1958), geometrical properties of mutual admiration patterning (Chatterjee, 1958), problematics of crowd psychology (Sodhi, 1958), group involvement in the causation of group tension (Prasad, 1958), religious group differences in values (Ray Chaudhury, 1958) and ethnic groups on social distance scale (Sinha and Upadhyay, 1962) have brought out interesting features relating to the nature and functions of group phenomena. Studies based on multiple adoption behaviour (Pareek and Chattopadhyay, 1966), prediction of multipractice adoption behaviour from some psychological variables (Chattopadhyaya and Pareek, 1967), value orientation and adoption behaviour of Indian cultivators (Singh, 1967) have explored a new line of research which reveals great deal of complexity in inter-personal processes.

Researches like factors in group task motivation (Faroqi, 1966), mental task in isolation and group (Sengupta and Sinha, 1926; Mukherji, 1940), the influence of communal background material in giving synonym and trait names (Kothurkar, 1957), influence of reference group and grouping according to performance quartiles and aspiration level (Goswami, 1958), factors in group motivation (Faroqi, 1966), motivational patterns and planned social change (Pareek, 1968a) have tried to focus on the influence of group on inter-personal processes. Personality and leadership problems in relation to group factors have been brought out in studies like leadership preferences as a function of authoritarianism (Bhushan, 1969b), leaders and their ability to evaluate group opinion (Chaudhury, 1949), and social rejection and friendship of adolescent boys and girls (Khanna, 1960). Some works connected with dependence proneness (Bhasin, 1959), dependence-independence trend in joint family system (Bhasin, 1959; Mitra, 1957), the n-Achievement/

n-Cooperation under limited/unlimited resources conditions (Sinha, 1968) have been undertaken with a great deal of imagination and technical skill. Such investigations are likely to unravel the inter-actional processes appearing in the various complex socio-cultural situations.

The research on conflict of generations indicating inter-generational gap (Sinha, 1967-69) is focused on the conflicts which are bound to appear between the generations in a country like India. More studies in this burning problem of modern times are needed.

There have been several investigations on group and inter-personal processes (Mukhopadhyay and Chatterjee, 1961; Mukhopadhyay, 1961; Panchbhai, 1963b) and some of them are of good quality and standard. The tone and standard set in this area of investigation as a whole is likely to lead the researches in the proper direction and produce very fruitful results in the near future. It is suggested that a greater emphasis should be placed on researches based on group dynamical and structureconomic model in future controlling different variables in experimental set-up.

Influence and Communication

Researches like prestige suggestion in insecure persons (Verma, 1969), ascendant submissive persons (Sinha, 1968), introverts and extroverts (Sinha and Ojha, 1963), prestige effects in body sway suggestibility (Das, 1960), prestige leaders and family friends as communicators (Mathur, 1967), prestige in occupations (Veeraraghavan 1966) have brought out very useful information on the effect of prestige influence on personality and social life.

Many research papers have dealt with problems of inter-personal influnce in relation to different demographic and personality factors. These include: influence of ego ideals on cultural heroes (Joshi and Joshi, 1967); some factors influencing the value patterns of college students (Reddy and Parameshwaran, 1966); cultural conflict and insanity (Dutta, 1948); personality types and social persuability (Srivastava, 1968); impact of caste on adoption of improved farm practices (Mundra and Batham, 1968); rumours as factors in public opinion during elections (Sinha, 1954); frustration and family tension (Mehta, 1954); student-teacher relationship in value incorporation (Dixit and Sharma, 1969); and psycho-social process of cohesion (Mukhopadhyay and Banerjee, 1961).

The work on communication research is not very extensive. Some papers in this area may be mentioned: communication process in interaction (Joshi, 1962); inter-personal communication at a different stage of adoption (Singh and Pareek, 1967); communication

behaviour of village level workers (Patel, 1967); impact of communication on rural development (Roy *et al.*, 1969); a study of interpersonal communication through opinion leadership in Indian villages (Sen, 1969); a study of communication in India, experiments in introducing change (Kivlin *et al.*, 1968); and content analysis of election propaganda (Mallick, 1962a). Another study was carried out to determine the most effective method of modifying certain caste and communal attitudes of secondary school children (Kothurkar, 1962). It was found that, for this age level, the emotional approach of warm approval and acceptance is superior to either purely informational or even the rational discussion approach. Anant (1966a, 1967b, 1969), in his studies on the concept of belongingness, found that an adequate sense of belongingness which comes from warm approval, recognition, acceptance and affection is an important factor in the mental health of the person. Not many investigations have been undertaken to tackle the problems of conformity and non-conformity, social pressure and conformity, etc., which are very fruitful lines of investigation. In this field of communication research, a group of papers on the method and application of content analysis opens up a new field of research which requires more attention from Indian workers (Mallick, 1962a, 1966, 1967a).

Social Perception and Motivation

Researches on social perception may be classified into three broad areas: perception of self and other inter-personal relations, perception of leadership and perception of other social processes. Some works that can be placed under the first category are: a study of some aspects of women's self perception and self evaluation in relation to their attitudes towards their sex role (Nataraj, 1966-67); bias in intter-personal perception among socio-metric mutual choices (Chatterjee and Nair, 1963); perception of human relationship as a function of inter-individual distance (Korner and Mishra, 1967) and subjective factors in judging personality traits (Rath, 1961). Though the number of papers is not large, their quality seems to be quite good. Some studies that can be included in the second category are: papers on differential perception of student leadership (Sinha and Kumar, 1965); perception of leadership role in rural setting (Kanungo *et al.*, 1965); and perception of leadership status in a free operant group discussion situation as a function of the knowledge of reinforcement contingency (Khemka, 1969). The third category dealing with perception of social processes includes investigations like perception of love by the married and unmarried women (Narataj, 1966-67); perception of attitudes (Asthana, 1959); awareness

of extension work in the villages of Agra (Sahani, 1967); people's image of community development blocks (Singh and Singh, 1967); and people's image of community development and panchayati raj (Sen, Gaikwad and Verma, 1967). The quality and standard of work done in the area of social perception seems to be good, although its quantum is small, especially in view of the vastness of the field. Personality and other socio-economic factors involved in social perception could be fruitfully explored.

Like social perceptual problems, the social motivational problems are also very important. The number of papers on motivational processes is also small. Motivation of rural population of a developing country (Sinha, 1969c) and a village in transition—a motivation analysis (Sinha, 1969b), are two very important pieces of research in this area. The findings of Sinha that the "villagers not only have low motivation but weak aspiration" will no doubt persuade the planners for better organization of planning and instigate the social scientists to explore this field much more intensively. There are other works like motivation behind marriage (Sinha, Ojha and Prasad, 1969); effect of sex and culture on achievement-motivation; and level of aspiration of villagers in community development block (N.I.C.D., 1963-65). The social perceptual and motivational problems have to be studied with better methodology and greater awareness of the scientific limitations of such studies. It is however gratifying to note that the few pieces of research done in this area have set the trend and direction for further research of this type.

IV. Communication

Language

There are three important papers dealing with language and communication. One discusses frequency of nouns, pronouns, verbs and adjectives in the spoken vocabulary of children, 7-8 years old (Chandra, 1960). The other paper projects the hypothesis that speech is disturbed whenever abstract attitude is impaired. Concrete-language undergoes modification due to impairment of the abstract attitude. It is suggested that the difficulty in finding words is a consequence of the impairment of abstract attitude (Asthana, 1955). The paper on culture, communication and silence discusses the fear of being misunderstood and the contribution of language to this fear. It is further suggested that social scientists can profitably study the role of silence in the different culture patterns (Ganguly, 1968).

Psycholinguistics

There are also three useful papers in this area. In one paper, the social-effective concept of meaning is defended (Bose, 1932). Another paper considers such problems as the infinitive forms of verb-words involved in wish-fulfilment and the revelations of psycho-analysis regarding intimate association of words with wish fulfilment (Bose and Ganguly, 1951). The third paper stresses the importance of psycho-analytical information and insight in understanding etymological research (Gait, 1928).

Syntax

There is one important paper in this area of research. It analyses the interaction of word class, sentence length and position of commissions (Sahgal and Chandra, 1956). It is concluded that distribution and grammatical structure of context are independent sources of constraint on words in sentences and these sources of contextual constraints are replicable phenomena.

The available information in this area indicates that no project type research has been taken up in the various aspects of language and communication research. The interactional processes involving effective or weak communication among the constituent components of transactional situation, the problems involved in training and supervising the groups etc. have not been taken up seriously. Similarly, essential studies on speech and language development in single or multiple language learning situations has not attracted the attention of the Indian psychologists so far. This area of research seems to be the weakest link in the Indian social psychological research.

V. Aesthetics

There are some very informative papers in this area. One study confirms the hypothesis that incipient artists differ significantly from non-art students in the ability to tolerate ambiguity, in creative productiveness (Ray-Chaudhuri, 1962, 1963, 1966a, 1966b). Another study reveals that drawings judged to be artistic are more likely to show clothing items and figures in action. Non-artistic drawings are characterized by showing the proper location of different body parts (Pathak, 1960). One investigation assesses the beauty value of aesthetic stimuli (Banerjee and Mitra, 1942). One paper deals with the concept of impurity and relates it to aesthetics (Mehta, 1945). Another study used the method of paired comparison for preference

of different colours and classified the subjective experiences into Valentine's four categories (Adhikari, 1960). A group of early studies on aesthetics (Berkeley-Hill, 1942; Halder, 1931, 1935, 1937; Sastry, 1939, 1942; Sen, 1944; Agarwal, 1949) still contain important points which may fruitfully be pursued.

This area, so to say, is still unexplored though there are immense possibilities. For example, the problems of semantic differentiation operating in the field of aesthetic appreciation has not been tackled at all.

VI. Sexual Behaviour

Two papers have come to the notice of the author on sex delinquency (Dasgupta, 1944; Mukherjee, 1955). The latter investigation revealed that, out of 500 crimes committed in Calcutta, 320 were sex crimes. These sex criminals were predominantly adolescents coming from middle class homes. They were unemployed and did not seem to have adequate education. The war and Bengal famine have been attributed as causes of this anti-social phenomenon. In other studies, various aspects of sex and its social implications have been pointed out. These include: sex in Tantras (Mukherjee, 1926); Psychology of Sexology (Abdin, 1940); duration of coitus (Bose, 1937); all-or-none attitude on sex (Bose, 1947); theory of sex (Bose, 1945); on divorce (Chandra, 1965a); deeper motives in loving (Dasgupta, 1947b); and on kissing (Jalota and Grewal, 1930). Considering the ramification and importance of this aspect of social psychology, more detailed and incisive studies are required to be conducted.

VII. Smoking and Drug and Alcohol Use

No work done in this area has come to the notice of the reviewer. Smoking, drug or alcohol addiction is a very important psychosocial phenomenon which cannot be neglected by the social psychologists. Social imitation, processes of identification, propaganda through various modes of advertisement and prestige suggestion have great influence on the development of these habits in addition to other personality deficiencies. Investigations on group membership and group pressure mingled with interactional problems of personality are likely to open up a new area of research which is essential for the understanding of such behaviour. When smoking, drug and alcohol habits are on the increase, especially in the adolescent population of this country, research projects in the area need to be undertaken urgently to tackle this psycho-social problem.

VIII. Methodological Contributions

In connection with attitude measurement, there has been some discussion on the construction of attitude scales based on various known methods of study. In addition to these attitude scales, there has been some work on sociometry, like estimating the probability of chance occurrence of an obtained score in sociometric type tests (Prakash 1957), a note on sociometry (Shrimali, 1962), the method of ranking in sociometric scaling (Faroqi, 1961), reliability of socio-metric choice scores (Chatterjee and Nair, 1963) and the new developments in social psychological research (Chattopadhyay, 1955) emphasize the implications of field theoretical approach. There is one paper on J-Curve hypothesis and a statistical measure of socialization which has brought out an interesting measure known as 'index of socialisation' (Prakash, 1957). Other papers which have made useful methodological contribution include: measurement of differences (Madhava, 1926); relative value of Poll-end question in research (Aschal, 1958); construction and standardization of a scale for measuring socio-economic status of farm families (Shripurkar, 1967), and factor-analysis of social attitudes (Rao, 1962). But considering the importance of methodology in social research, it may be said that serious attention has not yet been paid to this problem.

It is no doubt true that, in social psychological research, it is not always easy to draw the distinction between content and method. If the hypothesis is defective, even good methods are of no use. But refined and sophisticated techniques go hand in hand with the development of sound theory. Considerable efforts should therefore be made to develop refined measurement techniques.

Hardly any serious work has been undertaken on the problems connected with interview as a scientific technique. Problems like the interview bias, the coder bias, unreliability bias due to the form and phrasing of questions have not been touched upon. Similarly, no important work has been done on the various types of measurement of influence, response set and imagery. Factor analysis technique which might help to identify and isolate stable variables useful to describe various social situations can be successfully used.

The few attempts made in the area of methodology no doubt hold a promise for more fruitful research activities in this area in future.

Conclusion

This brief review of research in social psychology unmistakably demonstrates that works in this area have, on the whole, been

quite extensive, although there are serious gaps here and there. While many studies make an appreciable advance in the field of social psychology, most of the researches are confined to small studies on narrow aspects of large social problems. There is therefore an urgent need of an extensive investigation which would organize and synthesize the available information. There should also be more papers which integrate and summarize the work done: these would immensely help the research scholars in the field. The review of researches also show that the past investigations have been more problem-oriented than theoretical. This trend, by itself, may be useful. But there is also need for greater efforts in theory building and methodological development. These two aspects of the problem seem to have been neglected so far by Indian social psychologists.

The accumulated findings should be so synthesized that the various constructs verified by empirical findings would form comprehensive conceptual systems. Otherwise, we shall have only a series of unconnected and unconfirmed research findings without integrated theoretical systems to serve as basic foundations for hypothetico-deductive reasoning and research designing.

Development of methodology with clearcut ideas about national population and random sampling, along with all other rigorous statistical techniques will lend confidence to the researchers to arrive at generalizations. Confirmation of findings from the widely divergent population and from experimental manipulation of variables will ultimately establish acceptable generalizations leading to theoretical models. A precise theory without ambiguities can describe the relations among the inter-dependent parts of empirical observational systems and can be obtained with the help of rigorous methods of study. When such criteria are satisfied, the Indian researches in social psychology will attain maturity and command international respect.

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10

Methodology And Research Technology

A Trend Report

By

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Introduction

THE AREA of work under Methodology and Research Technology covers such diverse things as models, mathematics and statistics, factor analysis, computer programming, testing, construction and validation of instruments, experimentation and observation, and apparatus. In the field of psychology, the work on models, mathematics and statistics, computer programming and experimentation and observation is scanty, and the bulk of research in this area is concentrated on test construction, validation of instruments and factor analysis.

Reviews of tests and measurement were made from time to time by several psychologists. These were indicated and briefly summarized by me in an earlier paper (Mitra, 1968). Historically, the work on test development started in India at about the same time as in England and America and the early work was mainly devoted to the development of individual scales of intelligence. Mention may be made of Rice who made the first attempt at standardization of the Binet tests in Hindustani. He was followed by Kamat in Marathi and Kannada and by Shukla in Gujarati. One of the earliest published work on group test of intelligence (Bengali) is that of Mahalanobis. This was followed by the later work of Sohan Lal, Mohsin, Jalota and Desai. Systematic work on aptitude tests appeared on the scene later with Varma. Bhatia standardized a battery of performance tests of intelligence for the school going age. Although much work on such tests was done in some departments of psychology (e.g. Calcutta, Patna) and in teacher training colleges, it was not

reported systematically in books and journals. Contrary to popular impression, the present survey shows that the volume of standard published work on tests and measurement is much less in comparison to other fields of psychology. Most of the published work in this field falls in the last two decades, although, as stated earlier, the work started practically simultaneously with the Western countries. *The First Mental Measurement Handbook for India* (Long and Mehta, 1966) reports a larger number of variety of tests. But it also shows, in the information recorded, that a good deal of work is preliminary construction only.

Much work has been done at the M.Ed. and Ph.D. level on Goodenough Draw-a-man test of intelligence, but it is largely unpublished. Phatak has published a new scoring method of Goodenough test which she used in standardizing the test for Gujarati. Raven's Progressive Matrices have been very popular and local norms have been developed. The Indian norms on comparable population seem to be a little lower than those obtained in England. Among other foreign tests of intelligence and aptitude, Minnesota Paper Form Board, the NIIP and Moray House tests have received a good deal of attention, although little has been published. Attempts to develop non-verbal tests of aptitude have appeared only recently (Mitra, 1959).

Interest inventories attracted little attention. Among published work one can report only the work of Chatterji who has developed a non-verbal inventory modelled on Kuder and the work of Jhingran on a Hindi adaptation of Strong Vocational Interest Blank.

Krishnan seems to have been the first person to have seriously attempted the development of a test to measure schizothyme-cyclothyme trait. Cattell's 16PF has been very recently adapted in Hindi and released for use. Sinha (1961) prepared a test of manifest anxiety based on Taylor. Kundu recently released his Neurotic Personality Inventory in English.

This is a brief account of the historical trends in the field of tests and measurement, based on Harper (1960), Jalota (1965), Krishnan (1961), Mitra (1968) and Menzel (1956). From the dates of publication it appears that most of the work in this area was done in the last fifteen years. As stated earlier, most of the work during the intervening period remains unpublished.

Factor Analysis

It was in 1948 that the first attempt seem to have been made by G. Pal in using factor analysis for analysing a set of tests. He presented his work in a paper to the Indian Science Congress that

year. Jalota (1950) published perhaps the first paper in which a significant contribution was made. He showed an economical method for the rotation of multiple factors to a simple structure. Earlier attempts were more of the nature of exposition of the method. Most Indian work in this area, with the notable exception of C. R. Rao who has published his original work in foreign journals, is concerned with using factor analysis to analyse intelligence, aptitude and personality test scores.

Mooney's Problem Check List was put to factor analysis by Joshi (1964) using a sample of secondary school boys. Using the centroid method, he found the loadings on the first common factor to vary from 0.671 to 0.827. This he identified as the general adjustment factor. He found two other minor and bi-polar factors in his data. These two factors were named as Future Vocational and Educational and Curriculum and Teaching Procedure.

Saxena (1963) made a factor analytic study of the Vyaktitva Parakh Prasnavali, an adjustment inventory in Hindi. He found three common factors in the inventory on a sample of 150 males and 150 females. The first factor was named as Health Centered Emotionality (43.38%), the second factor as Social Tact (41.27%) and the third as Home Centered Emotionality (15.35%).

Das (1958) used factor analysis on a hypnotic scale and identified two factors. One was named as hypnotizability and was a common factor accounting for 53.3 per cent of the variance. The second factor was bipolar, accounting for only 6 per cent of the variance.

Raj (1957) factor analysed Krishnan's personality inventory using it on 400 male college students. Using Thurstone's Complete Centroid method, six factors were extracted and rotated orthogonally to simple structure. The first four factors were named as Cyclothymia, Sociability, General Adaptability and Sensitiveness.

The use of factor analysis in studying personality tests is illustrated by the studies cited above. We shall now present some studies where factor analysis was used to understand the composition of intelligence and aptitudes.

Hundal and Handa (1963) factorized a matrix of inter-correlations obtained from the scores of 400 students of grade 8 (modal age 14 years) on a General Mental Ability Test. Thurstone's Complete Centroid method was used. Three rotated factors were identified as Verbal Comprehension, Perceptual Organization and Reasoning.

Chatterjee and Mukherjee (1968) constructed a battery of aptitude tests for students in class VIII. They used the tests on a sample of 386 girls and 656 boys reading in class VIII, from twelve different higher secondary Bengali-medium schools in Calcutta, selected randomly. The tests were: English knowledge and comprehension,

Clerical aptitude, Abstract reasoning, Verbal reasoning, Mathematical knowledge, Scientific knowledge and aptitude and Mechanical comprehension. Factor analysis was done separately for the boys and girls. Using Humphrey's rule and Coomb's criterion, they extracted three factors which were rotated orthogonally to a simple structure. More or less similar factor pattern was obtained for the boys and girls. The difference between factor loadings of boys and girls is maximum on Scientific knowledge and aptitude on the first and third factors. The difference in loading is maximum in the second factor for English Usage test. In general the communalities are higher for the girls.

Hundal and Singh (1964) administered a General Mental Ability test for grade ten to 400 male students drawn from grade ten of higher secondary schools in Amritsar District. The sub-test correlations were then put to factor analysis, using Thurstone's Centroid method. Communalities estimated were the highest correlations in each row. Three factors were extracted and their reference axes were rotated following Thurstone's oblique rotation by the method of extended vectors. Three factors were extracted: general mental ability, verbal and special reasoning ability.

Factor analysis was used by Mitra (1958a) to find out whether the total or aggregate marks have any meaning. He analyzed the examination marks of a small group of postgraduate students and found the common factor variance to be low. He used Eysenck's method of rotation through the criterion in another study where the factor analyzed the correlation matrix obtained from the administration of a set of aptitude tests on a large number of medical college entrants (Mitra, 1961b). He rotated the test factors through the criterion, viz., examination marks, so as to maximize the loadings on the criterion and found English Usage with the highest loading.

Lawby Rao's method of maximum likelihood as also canonical correlations have not attracted the attention of Indian psychologists.

Testing

Psychological testing includes four types of variables viz., tester, testee, testing situation and the test. Systematic studies of the first three variables are rare in India.

Rao (1968) attempted to standardize a vocabulary test in Hindi for high school boys. She noticed a sudden improvement in vocabulary score after 13 years. In a study of the relation between manual dexterity and intelligence, Kapoor (1964) found a correlation (Rho) of 0.34 between Tweezer Dexterity Test and Jalota's General Mental Ability Test. Jayalakshmi (1959) found that tests of psychomotor

ability correlate higher with mechanical comprehension and have practically no correlation with general intelligence.

Rao (1965) used Cattell's Culture Free Intelligence Test (Forms A and B of Scale 3) on students in high school and college. She noted that the Indian norm was lower than corresponding American norm. She raised the question whether the test is really culture-free or whether test sophistication is a factor on the American scene. Maitra (1965) found that Raven's Progressive Matrices Test (1956 version) has good difficulty and discrimination values of items on an Indian sample. The values compare favourably with the original. He, therefore, thinks that the Progressive Matrices has a low cultural loading. Chatterjee and Mukherjee (1970) found that a non-language test of verbal intelligence is as good a predictor of school marks as a verbal test of intelligence.

Construction and Validation

In India, upto 1921, research on construction and validation of psychological tests was conducted by Christian missionaries engaged in educational work, among whom may be mentioned E. L. King of Narsinghpur and D. S. Herrick of Bangalore. Work on Binet tests was done by Miss Gordon at Madras, West at Dacca, Spence at Jabalpur and Wyatt and Rice at Lahore. Group tests based on the Otis were first devised by J. M. Sen in collaboration with G. Dasgupta of the David Hare Training College at Calcutta and papers on this subject were presented at the Indian Science Congress in 1925 and 1926. Work was done on the development of Indian norms for some foreign tests like the WAIS, NIIP 70/23, Raven's Progressive Matrices, Minnesota Paper Forms Board, Alexander's Passalong, Cube Construction, Kohs Blocks and Goodenough. It is only since 1950 that published evidence points to the construction of Indian tests.

In the area of aptitude tests, Varma made the first systematic attempt to construct a battery of differential aptitude tests based on Thurstone's primary mental abilities. Indian adaptation of the DAT has been done by Bhatt and Ojha.

The number of special aptitude tests is small in comparison to the number of major occupations. Some special aptitude tests have been constructed at the Psychometric Unit of the Indian Statistical Institute in Calcutta since 1955. These are largely for different courses of studies. Aptitude tests have been developed by the Ministry of Defence and the Ministry of Labour for the selection of military personnel and various types of industrial workers. Deb (1965) constructed an engineering aptitude test.

In personality tests, the projective techniques like the TAT, CAT and the Rorschach have been widely used, although there is considerable paucity of published information in this regard. Indian norms on the Rorschach were developed by Asthana (1950a). The Indian adaptation of TAT and CAT was done by Uma Chowdhury and the adapted version is distributed by Manasayan (Delhi). There have been several attempts (Broota, 1964) to Indianize the TAT pictures, but as yet we do not have an Indian TAT comparable to the CAT. Among objective personality tests, Cattell's 16 PF has been adapted in Hindi and is distributed by Psychocentre (Delhi). Ray Choudhury and Hundel (1958) and Ray Choudhury and Gandhi (1958) have adapted Allport's ascendance submission tests. Ray Choudhury (1959) also adapted Allport's scale of values.

Nijhawan (1965) studied the reliability and validity of Northumberland Intelligence Test on senior school students. She found a K-R 20 and split half reliability of 0.90, but a test-retest reliability of 0.62. In studying the validity of Hundal's test of General Mental Ability, Singh (1967) found that the correlation of the test scores with test examination ranged between 0.59 to 0.67. Pareek and Trivedi (1964) reported a study of the reliability and validity of a rural socio-economic scale. Stability co-efficient was found to be 0.87 on N—25. Inter-judge reliability was 0.93. For validity, factor analysis was done and three factors were found viz., land or economic factor, occupation or caste factor and education or quality of living factor. Goshal (1965a) reported the validity of psychological tests for the selection of special class railway apprentices. Sinha (1965) studied the validity of his Anxiety Scale by comparing a group of 239 undergraduate engineering students with 65 hospitalized patients and 17 other cases displaying pronounced anxiety. The mean difference was tested for statistical significance and it was found that the scale was discriminating between the groups in the right direction. For item validity Mitra (1959) used Attneave's techniques of scaling and demonstrated with Krishnan's Study Habits Questionnaire the validity of most of the items. De and Giri (1962) made a study of the diagnostic validity of the Sentence Completion Test by comparing two groups, one of ordinary students and the other of rehabilitating orphans. Parameswaran and Sundaram (1962) used the top and bottom 27 per cent technique in studying the item validity of their A-S Reaction Test.

Banerjee (1962) reported the development of four Likert Scales of attitudes to government, morality, religion and society. Sinha (1968) constructed a test of dependence-proneness with a reliability of 0.67. Rabindradas (1969) has reported the construction of a structured projective test to measure rigidity. Kuppuswamy (1959)

developed a scale to measure socio-economic status. Mohsin (1959) constructed a scientific aptitude test with a reliability of 0.912. Krishnan (1965) reported the development of a scale of Mysore Personality Inventory to measure leadership among students. Kundu (1963) reported item analysis of a neurotic personality inventory constructed by him. Mitra (1959) reported the construction of two forms of a reasoning test called Series Completion Test. Chatterjee and Mukherjee (1967) reported the development of a non-language test of verbal intelligence. Whereas Mitra used the overlearned alphabets a and b to make incomplete series, Chatterjee and Mukherjee claim that their test is a test of verbal intelligence, though the items are pictorial. Rao (1964) reported the construction of a Directions Test for measuring bilingualism. He obtained a reliability of 0.84. Mallick (1964) constructed a psychological scale of angle. Dass, Akbar and Singh (1965) devised a visual memory test for the classification of communication rates (visual signallers). The retest reliability obtained by them was 0.87. Pareek and Singh (1966) developed a scale for rating the communication skill of farmers. Sharma (1960) developed a test battery of reasoning ability consisting of five subtests. Deo and Arora (1966) constructed a projective test consisting of pictures to measure social distance. Sinha and Sinha (1969) reported the development of a scientific aptitude test for college students. They reported validity coefficients against examination marks ranging between 0.34 to 0.42. Rao (1964) reported the development of S.V.U. Personality Scale. The revised scale was found to have a split-half reliability of 0.96.

Methods

Ram (1939) was the first to publish a paper on the questionnaire method in psychology. In this paper he raised the methodological issues of reliability and validity. Misra and Dutt (1965) made a comparative study of two psychological scaling methods viz., rank order and pair comparison. They did not find any significant difference, except in time. Shanker (1964) devised a simple method of scoring a social distance scale. Ray (1965) compared three different methods of item scoring. Das (1957) made a methodological analysis of interview data for personnel selection. In a subsequent paper (1960), she showed the application of the method of fractile graphical analysis to item analysis and reliability. In another paper (Das, 1959) she presented a rapid and reliable method for estimating percentile scores of examination marks and test scores. Kundu (1961) compared three methods of computing tetrachoric correlation.

Some Priority Areas

What has been presented above is an overview of the work done in the areas covered. It is to be noted that during the last decade there has been considerable sophistication in test construction. But certain trends are rather disturbing. Although in most cases, item analysis data are reported with difficulty and discrimination indices for each item, there is little evidence of the use of item statistics in improving distractors of multiple-choice items. Although sampling has improved, there is still a good deal of incidental rather than probability sampling. Discrimination validity, as proposed by Campbell and Fiske, has not yet been reported by a single investigator.

Indian adaptation of the Binet tests is available in most Indian languages, though each one may not be equally good. The 1960 revision of the Stanford Binet has not yet been adapted. The WISC and the WAIS also need to be adapted in various languages. Groups tests of intelligence for the higher ages in schools are available in most parts of the country. But good tests for adults as also for primary schools are needed. A performance test battery, like Bhatia's, needs to be standardized in different language areas to provide the link test in equivalence studies. The Differential Aptitude Tests developed in Hindi need to be translated and adapted in other languages. Work on adaptation of personality tests has started recently. It is to be hoped that there will soon be a large number of personality tests, original as well as adapted. Creativity is a neglected area. Work on this has to start immediately.

It is necessary to draw the attention of research workers to the neglected areas of model building and application of models, methodological studies of experimentation and observation, computer programming and construction of apparatus. In the field of tests and measurement it is necessary to study experimentally the variables of tester, testee and the situation.

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Errata

1. On p. xxi, line 2, 3300 to read as 3,000.
2. In N. B after Table 1 on p. 61, 120 to read as 122.
3. In Table 4 on p. 64 against S. No. 2 under column heading 'Adolescence' 47 to read as 48, and the Total 96 to read as 89.
4. In Table 4 on p. 64 against 'Total' for the whole table, 65 to read as 66 and 129 to read as 122.
5. In Table 4 on p. 64, the two asterisks above 129 to be removed and the corresponding footnote.
6. Delete last line on p. 81.
7. On p. 187, line 16, a full stop to follow the word 'organization' and the following letter 'o' to be read as Capital O.
8. On p. 210, line 20, the prefix 'Dr.' to be deleted.
9. On p. 211, line 35, 'acquiscance' to read as 'acquiescence'.
10. On p. 270, line 19, 'standadized' to read as 'standardized'.
11. On p. 272, line 26, 'Pars, Ram' to read as 'Pars Ram'.
12. On p. 274, line 14, 'effective' to read as 'affective'.
13. On. p. 274, line 34, 'stimulate' to read as 'stimulus'.
14. On p. 288, line 32, B. Ray (1964) to read as B. Roy (1964).
15. On p. 417, line 31, Lawby Rao to read as Lawley-Rao.
16. On p. 421, line 10, 'discrimination' to read as 'discriminant'.

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